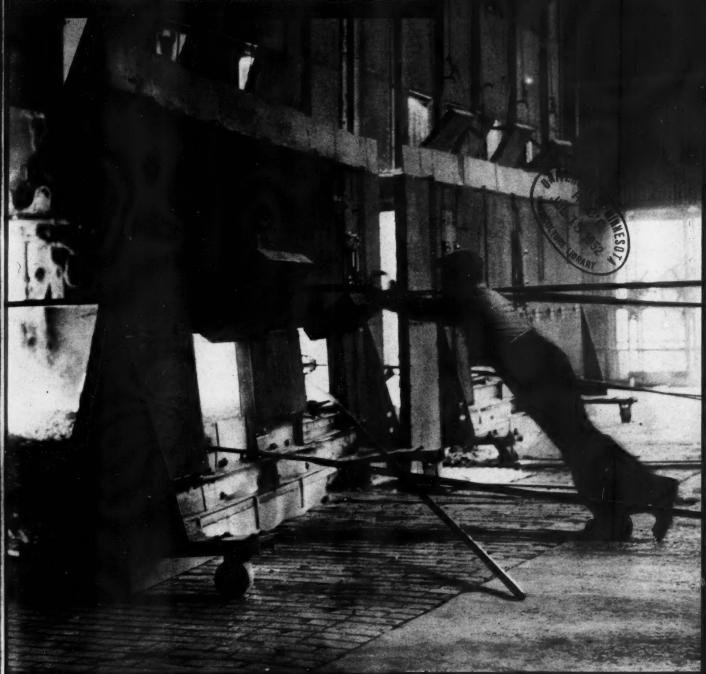
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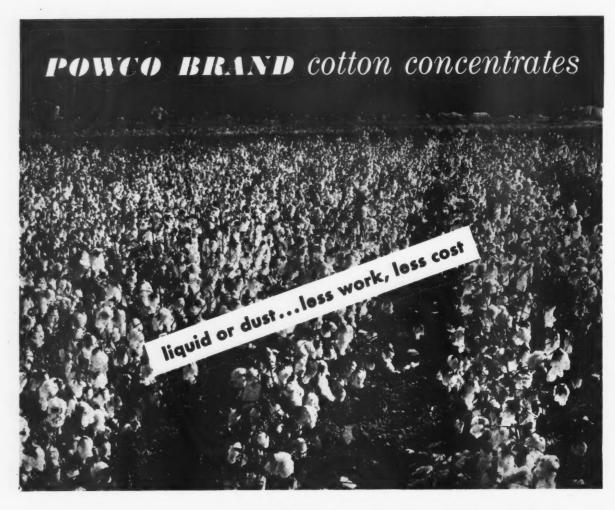
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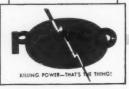
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WE CALL 'EM

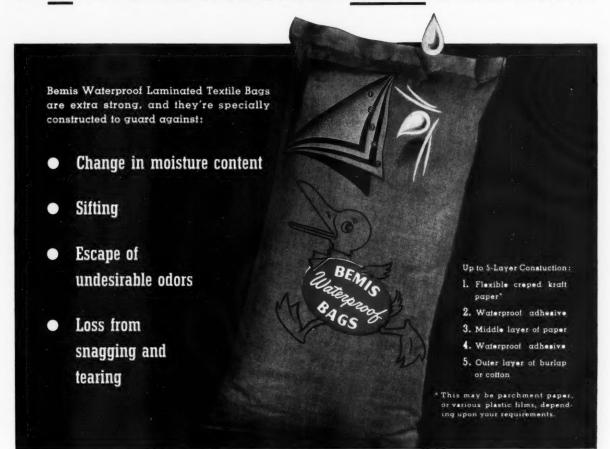
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In this issue . . .

Just about everybody in the fertilizer industry expected total consumption of plant foods to break all records for the year ended June 30, 1951. But estimates varied as to the exact figure that would be reached, and many observers were surprised when the actual figures were released last month by the USDA, showing a jump of 14 per cent in consumption over 1949-50. Total was 20,988,740 tons, including 1,-238,234 tons of nitrogen, 2,110,127 tons of available phosphoric oxide and 1,379,794 tons of potash. For more figures (there are hundreds of them) read the full report on page 13.

By now, most personnel in the fertilizer industry are "rested up" from their excursions to the Shenandoah Valley. Come to think of it, they didn't really have it so bad. There was golf, tennis, horseshoe pitching, cocktail parties, banquets and lots of other entertainment for the visiting delegates at the National Fertilizer Association and American Plant Food Council conventions. Then, of course, there were some very important speeches and discussions about the future of agriculture and the responsibility of the associations in helping it progress. For details of the NFA get-together at Greenbrier, see the story on page 29. Meeting at the hotel in White Sulphur Springs, W. Va., June 16-18, delegates heard a prominent group of speakers, including Milton S. Eisenhower, Allan B. Kline and Sen. Karl E. Mundt. The Homestead, at Hot Springs, Va., was the scene of the Plant Food convention, June 19-22, at which Sen. Harry F. Byrd headed a distinguished list of speakers. For a roundup of that meeting, see page 33.

Pesticide manufacturers have been concerned for the past few years with the increasingly difficult problem of controlling insects which have developed resistance to pesticidal materials, principally DDT. In recommendations for pest control during 1952 by the Communicable Disease Center, Public Health Service, Atlanta, Ga., the problem is discussed and chemicals are suggested for alternate use in situations where insect resistance is evident. Read about the recommendations on page 38.

An excellent guide to pesticide usage and expected usage is given in the article on the last page of this issue. It is based on a summary of regional uses of pesticides compiled by the USDA under sponsorship of the Office of Materials and Facilities, Production and Marketing Administration. Manufacturers of pest control chemicals should be interested in the breakdown of distribution of 11 typical pesticides, showing estimated consumption during 1949–50 and 1950–51.

farm chemicals

Formerly American Fertilizer & Allied Chemicals

Established 1894

PIONEER JOURNAL OF THE FARM CHEMICALS INDUSTRY

Vol. 115 JULY, 1952 No. 7

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Cover Story

In the production of calcium cyanamide at the Niagara Falls plant of North American Cyanamid limited, four furnaces like the ones in this month's cover photograph are used. A mixture of lime and coke is fed onto the top of the carbide furnaces by long tubes from feed hoppers above.

A magazine international in scope and circulation and devoted to manufacturers, mixers, and formulators of fertilizers and pesticides

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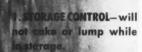
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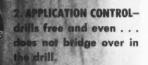
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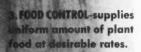
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Davison's Granulated Superphosphate with 3-way control can mean added sales for you!

No longer is it necessary for you or the farmer to worry about lumping or caking... Davison's Granulated Superphosphate will store without becoming hard or caked. And when the farmer starts to apply Granulated Superphosphate in the field he will find there is no dusting nor will it bridge over in the drill. Granulated Superphosphate drills freely and evenly giving complete coverage. Because of the granular structure, plant food is released at desirable rates.

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farm chemicals facts

. . . Briefly Noted

The normal investor would consider himself fortunate if he got a 10 per cent annual return on an investment. But farmers can expect from 200 to 800 per cent return each year from their investment in fertilizer, the National Fertilizer Association pointed out in a recent issue of its Fertilizer News. The article declared "this is the point we in the fertilizer industry must put over if we are to move the greatly increased supply of fertilizer that soon will be available."

John Powell & company has added a new insecticide plant at Elkton, Md. It was purchased from the EDCO corporation and will be expanded and improved. Plant will be an important source of insecticide materials for southern New Jersey and other Atlantic Coast areas, offering spot delivery service. James Lyons will manage the unit.

Commercial Solvents corporation now is located at 260 Madison avenue, New York 16, after moving recently from offices at 17 East 42nd street and 745 Fifth avenue.

"Insecticide Airlift" is the name given to an emergency program in India for fighting a locust plague in Iran that has been called the worst in a century. Thirteen tons of anti-locust chemicals are being flown from India to Shiraz, Iranian headquarters for the battle against the locusts.

The long line of soil conditioners just keeps coming. Latest is American Cyanamid's "Aeritil," described as an acrylic soil conditioner and stabilizer. It comes in two forms: as a soluble, highly concentrated flake containing 83 per cent active ingredients and as a powder with 40 per cent active ingredients.

Effects of ammonia on soil will be studied under a new fellowship at the Agricultural Experiment Station, Rutgers University. Suburban Farm Service company, Whippany, a subsidiary of Suburban Propane Gas corporation, which is introducing anhydrous ammonia in the East, is financing the grant of \$2,500 a year.

E. S. Elgin has been transferred from Chase Bag's Philadelphia branch to its Chicago general sales office. Elgin will direct sales and promotion of crinkled paper, polyethylene and waterproof products.

Shell Chemical's Newark office has been moved from 1180 Raymond boulevard to 10 Commerce Court, Newark 2, N. J.

Annual public hearing on grades of fertilizers to be recommended for sale in Louisiana, Arkansas, Oklahoma, New Mexico and Texas next year will be held at the Buccaneer Hotel, Galveston, Tex., July 10–11. Papers and discussions will be featured the first day and grade hearing is scheduled for July 11.

James H. Zwemer, formerly of Monsanto Chemical company, joined Smith-Douglass company last month, as manager of research and development, with headquarters at Norfolk, Va.

Bag sales for Kraft have been placed in the charge of James W. Taylor, formerly assistant district manager for St. Regis Paper company in southeast U. S. Taylor is located at the company's executive offices, in New York City.

Stanco Sulphur Products will operate a sulfur mine near Auburn, Wyo., in the summer, J. B. Stanley, head of the organization, has announced. Sulfur from the mine will be used for insecticides and will be marketed in pellet form.

Members of the fertilizer industry have been invited to attend a national phosphorus symposium relating to soils and fertilizers to be held at the University of Illinois Aug. 26–28. The symposium is being sponsored jointly by the National Soil and Fertilizer Research committee, Soil Science Society of America, American Society of Agronomy and the University of Illinois. It will consist of five half-day sessions.

Edward T. Casey has joined the sales staff of H. J. Baker & Bro., 102-year-old importers and exporters of fertilizer and other materials.

A third member of the Connecticut Agricultural Experiment Station has been honored with election as a fellow in the American Academy of Arts and Sciences. He is Dr. James G. Horsfall, director of the station, and nationally known for his book "Fungicides and Their Action."

A more aggressive follow-up investigation of fertilizers and feeds in violation of state laws has been promised by D. A. Stubblefield, state agriculture commissioner of Idaho. He said manufacturers have a 30 day period in which to correct faulty products and if they fail, their licenses will be revoked.

George A. Most Jr. has succeeded Stuart T. Penick as district manager at Moline, Ill., for Link-Belt company. Penick is new sales engineer specializing in power plant coal handling at Colmar, Pa.

Dr. E. M. Crowther was reelected president of the Fertilizer Society at the fifth annual meeting recently in London. J. Angus was named to another term as vice president. New members of the Council include J. B. Davies, Dr. J. Manning, J. W. Steventon and Dr. R. Stewart.

Insecticide-fertilizer mixtures in Virginia no longer are allowed. The state farm department said makers can distribute any such mixtures only to research personnel at state stations for test use exclusively.

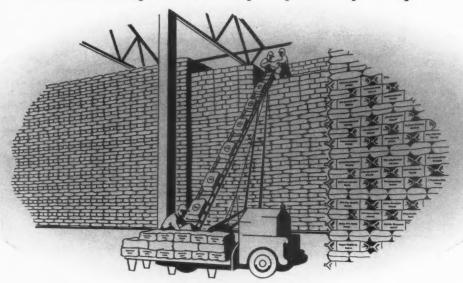
Wyandotte Chemicals corporation has appointed H. E. Tremain director of a new department of contract research. He will be in charge of all research activities under direct contract with governmental agencies.

Resignation of J. Newton Hall, vice president in charge of sales and Roy J. Miller, vice president in charge of manufacturing for Julius Hyman & company, has been announced. Action followed acquisition of the organization by Shall Chemical corporation.

The insecticide synergist "Sulfoxide" has been approved by the USDA for use in aerosols, after a study of the warm-blooded toxicity of the product. "Sulfoxide" is manufactured by S. B. Penick & company.

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'Service to Safety'

FARM CHEMICALS was awarded a Public Interest Award for "exceptional service to safety" by the National Safety Council last month.

The award was presented at a luncheon meeting of the board of governors of the Philadelphia Safety Council, a member of the parent organization. The presentation is described in an article in the Industrial News section of this issue.

FARM CHEMICALS is especially proud of the award because this magazine is the only one serving the farm chemicals industries which was so honored.

When a letter from Paul Jones, director of Public Information of the National Safety Council, came to our office a few months ago inviting nominations for safety awards, we were skeptical about our chances.

But when we looked back over the magazine files for 1951 with an eye toward articles on safety, we were amazed. Month after month, from January to December, the story was the same. In our Industrial News sections there was a steady flow of reports about company safety activities and awards.

In addition, the magazines included numerous full length feature articles, some illustrated, about safety in the industry. All the articles were about fertilizer and pesticide plants, and most of them were written by top personnel in the industries—personnel highly qualified to disscuss the problem.

A brief resume of some of the items included in the magazines will illustrate our participation in the safety program:

January—"How to Handle Ammonium Nitrate." February—"Davison Safety Achievement May Set National Record."

April-safety standards in "Bottled Fertilizer."

May-"Five Davison Plants Were Accident Free in 1950," "St. Regis Paper Sets Safety Record in 1950."

July—"Fertilizer Industry Safety Program."

August—"Central Dust Control Unit," "Safety Manual Off Press."

September—"Bemis Wins Safety Award."

October—"Safe Operation of Equipment," "Fields

Elected Safety Head."

November—"Handling Bulk Storage," "DuPont Safety Record Laid to Employe Program."

December-"Good Housekeeping in Industry."

The award, as we see it, means two things:

- 1. The trade press can do a big job toward disseminating information about safety to all members of the industry. It can call attention to innovations in the field, give recognition to company activities and help coordinate safety drives.
- 2. Far more important, the award means farm chemicals industries are doing an excellent job in promoting safety among employes in all departments. It's obvious that every news item carried in our publication last year reflected a noteworthy achievement, an "exceptional service to safety" by the industry itself. Frequent requests for reprints of feature length articles on safety indicate clearly this material not only is widely read in the industry but considered important for distribution to its personnel.

COMPANY safety activity, as reported in Farm Chemicals, has taken two forms: First, the activities of individual companies in promoting safety and in stimulating company safety records. Second, their participation in such cooperative programs as the Fertilizer subcommittee of the Chemical committee of the National Safety Council.

Meetings by this and other groups to discuss methods of improving working conditions have added to industry knowledge of the problem and have yielded solutions to many difficulties. Creation of safety committees in an increasing number of plants can be traced in part, at least, to the excellent job being done by these groups to stimulate interest in the worthwhile project.

By describing the work of individual companies and safety groups, we sought to reflect the progressive steps being taken in the industries to save lives, time and money. By so doing, we were awarded a plaque for our contribution to safety.

Our major satisfaction, however, comes not from that award, but from the knowledge that the industries with which we are concerned in our editorial columns are doing such a fine job in the cause of safety.

We will continue to help that cause.

-Hamilton C. Carson

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8

FARM CHEMICALS

farm chemicals outlook

Report from Washington by Fred Bailey & Don Lerch

It's "Westward Ho!" for the fertilizer industry. Washington talk is centered on the potential of the industry in the Midwest. It was a long time coming, some say, but now fertilizer manufacturers are opening a new frontier where the prospect of "green gold" surpasses anything we've seen yet.

New records of service to agriculture are in the making by industry as thousands of midwestern farmers learn for themselves what fertilizer can do on their own farms. Agronomists have known for years that even highly productive soil usually responds to the addition of plant food. But it took a war, tremendous changes in the economics of farming, plus steady work by the industry to dent the breadbasket.

Increase in fertilizer consumption in this seven-state area over the past decade is estimated at nearly 800 per cent for the fertilizer year 1950-51. Minnesota, Iowa, Missouri, North Dakota, South Dakota, Kansas and Nebraska provide one of the most fertile areas for increased sales in the country in the opinion of most observers here. The big increase in sales here so far this year is only the beginning, they say.

While the South still is the top market, there are significant inroads being made in some of the leading states including North Carolina, South Carolina, Kentucky and Mississippi, all showing reduced consumption based on last year's statistics, the latest available. The South has been the birthplace of most of this year's discouraging sales reports too.

Fertilizer boom in the Midwest this year is seen here as adding drive to the government's policy of encouraging the spread of the industry to the midwest. This factor looms large in considerations for tax amortization certificates. It is an important part of the grand strategy for increasing food production to meet our expanding production.

Segments of the pesticide industry are jittery over commercial use of systemic insecticides. Announcement of their approval by the USDA sparked renewed interest in the field by the press. If not properly handled, uninformed speculation could touch off another round of "scare stories."

Systemics hold great potential in the opinion of most scientists here. Properly tested and applied, they can give outstanding performance in the protection of approved crops.

More systemics apparently are on the way. A number of U. S. companies have been developing systemics over a period of years. The use of these materials has been permitted in Great Britain for several years.

Politics and strikes, resulting in one of the biggest jams Congress has faced in years, apparently give the pesticide industry more time to prepare its case for sound legislation. Delaney Committee report will serve as the basis for legislative proposals which industry will be called on to meet.

Appalling health conditions in many areas of the world are seen here as a lever being used by other countries to get U. S. money for the construction of pesticide plants abroad. Use of the plant capacity to meet agricultural needs is considered a logical second step. Industry spokesmen question the soundness of the proposals.

Watch for a new series of USDA reports showing possibilities of increasing production by 1955. Survey has been made by BAE and the land grant colleges. Re-

sults should be unveiled in early summer.

Fertilizer is the key to official planning for increased food and fiber production. Coupled with pesticides, better farming practices and mechanization, officials believe we can keep pace with growing needs at home and abroad.

Iowa farmers can increase corn production from 49 to 60 bushels per acre through the use of fertilizers, some studies show. This kind of story is expected to comprise the bulk of the new government reports.

Other significant factors are:

1. Farm capacity to produce is about 20 years ahead of earlier forecasts.

2. Future of livestock production is tied directly with increased yields of feed grains requiring increased fertilizer usage.

3. Pastures are being looked upon as an increasing source of livestock feed. Some field tests show that hogs can be finished for market with less than five bushels of corn . . . the remainder of their diet coming from improved pasture.

Both plant food content and rate of application are increasing. Latest tally shows plant food content averaging 22.4 per cent during the last fertilizer year. Heavier rates of application are tossing a new problem into the laps of equipment manufacturers. It has been talked about for years . . . now the problem is here.

Heavier applications in the 50 to 150 acre farms of the South and East didn't make much difference since there was equipment to handle most conditions. Increasing the rate of application on the 160 to 400-acre farms in the midwest is another matter.

Experiments are on record showing that a heavy application of fertilizer broadcast on pasture in a three-year rotation with corn and barley, yields the same amount of feed over the three-year period as single applications on each crop. This is probably not the entire answer because the crop to which the heavy application is applied usually can be expected to show the greatest increase in yield.

Changes in machinery design are to be expected. Some officials feel that improvements embodying increased fertilizer carrying capacity, ease of loading, and non-corroding parts will have an important bearing on speeding increased usage.

Farm organization leaders are emphasizing the need for increased production of higher analysis fertilizers. They point to ever-rising freight costs as a compelling reason for speeding progress in this direction.

How to encourage farmers to buy more fertilizers is receiving even more attention in Washington these days. Officials recognize need for increased fertilizer usage . . . but the record shows that consumption closely parallels farm income. USDA is putting more pressure behind its department-wide "sales campaign." The front office is depending upon its scientists to make the ammunition for convincing sales arguments.

Big question is . . . who is going to take the story to the farmer? Washington says it is going to do a major share of it. The Land Grant Colleges are expected to carry through in their respective states. There is considerable division of opinion here on how the program should operate. In some states, college and government officials work well together. In others, there is continuous bickering over lines of authority and the role of "federal men."

There is growing support for the concept of getting the fertilizer story down to a county basis. General stories that an extra ton of fertilizer will produce so much extra corn aren't considered of much value unless the individual farmer can apply the findings to his own farm. Since soil and crop conditions vary so widely, it is argued that the real work must be done at the state colleges with allowances made for county differences.

Industry representatives fresh from their conventions are discussing specific plans for expediting this campaign. These mid-summer meetings will serve to strengthen effective cooperation between industry and the government.



A WHOLE FARM THRIVES ON NOURISHMENT

Horses or pigs...oats or corn...it's nature's design that makes each living thing on a farm grow every hour of every day. Because growth and nutrition go hand-in-hand, there is an unending demand for the rich plant-food elements in the soil, upon which every growing thing depends.

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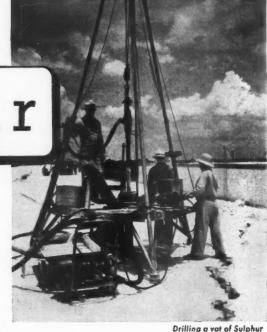
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FARM CHEMICALS

Fertilizer Consumption

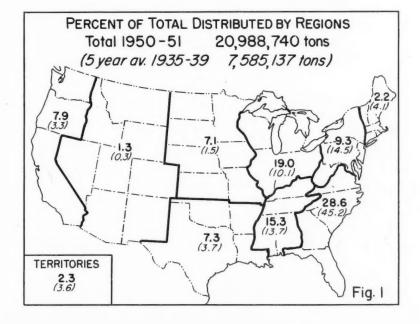
in the United States

1950 - 1951

By

WALTER SCHOLL and H. M. WALLACE

Division of Fertilizer and Agricultural Lime
Bureau of Plant Industry, Soils and Agricultural Engineering
Agricultural Research Administration
U. S. Department of Agriculture
Beltsville, Maryland



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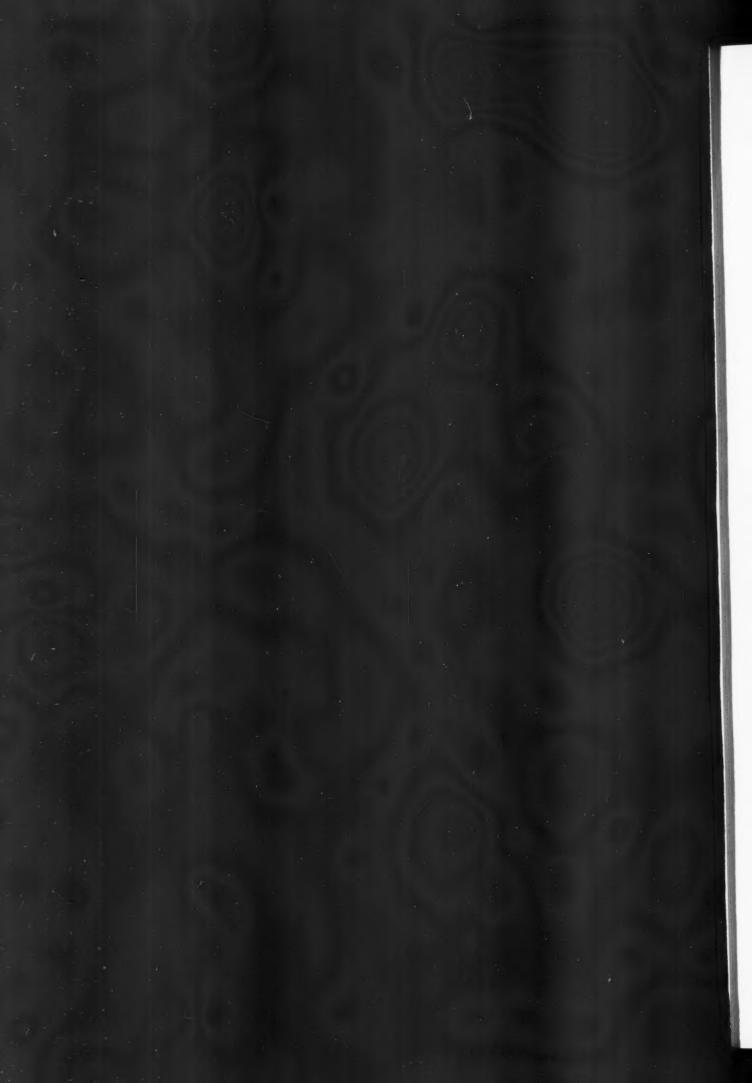
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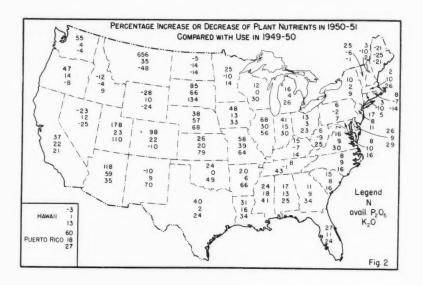
THE RAYMOND BAG COMPANY







Fertilizer Consumption - Largest Ever . . .



ARGEST consumption of chemical fertilizers ever recorded was made in the year ended June 30, 1951.

According to the recently released report of fertilizer in the United States a total of 20,988,740 tons was consumed. This included 1,238,234 tons of nitrogen, 2,110,127 tons of available phosphoric oxide (total P_2O_5 , 2,537,162 tons) and 1,379,794 tons of potash.

The total is an increase of 2,645,440 tons of fertilizers or 14 per cent more than the consumption of 18,343,300 tons reported in 1949–50.

Mixed fertilizers, 13,977,850 tons, constituted 66.6 per cent of this total. The other 33.4 per cent, used mainly for direct application, was composed of superphosphate, 1,773,279; phosphate rock and colloidal phosphate, 1,039,624; sodium nitrate, 683,800; ammonium nitrate, 638,176 and gypsum, 606,897 tons, with lesser quantities of more than 60 other materials. weighted average nutrient content of commercial mixtures used in 1950-51 was 24.19 per cent as compared with 23.24 per cent in 1949-50.

Data herewith show the number of tons of fertilizer reported shipped by manufacturers for consumption in agriculture throughout the fortyeight states and the territories.

The amount of nutrients (N, P_2O_6, K_2O) contained in these fertilizers was computed from tonnages determined in this survey and analyses published by state control officials. The weighted average nutrient content of commercial mixtures was determined from the grades and tonnages reported for each state and average overrun or underrun. Fertilizer manufacturers, state fertilizer control officials and agronomists cooperated freely in providing information for this 12th annual survey.

Tonnage by States

Consumption of all fertilizers, by states, regions and classes, is given in Table 1. Although the United States as a whole used more fertilizer in 1950–51 than in 1949–50, several states used less, including the New England states, excepting Massachusetts and Vermont. Largest decrease (48,469 tons) for any state was in Maine. Consumption in that state, therefore, was about the same as in 1940.

Consumption increases of 100,000 tons or more were recorded in 10 states. Largest increases were 412,274 tons in California, 306,352 in Illinois and 229,619 in Missouri. Six states, Alabama, California, Florida, Georgia, Illinois and North Carolina used more than a million tons each. In 12 other states, more

than one-half million tons was recorded. Distribution, by regions, is shown in Figure 1 as the percentage of the total consumed in 1950–51. For comparison, the average percentages in agricultural statistics for the years 1935 to 1939 also are shown.²

Mixtures

The 13,977,850 tons of mixed fertilizers consumed in continental U. S. and territories in the year ended June 30, 1951 comprised 66.6 per cent of total fertilizer consumption, as compared with 67.0 per cent (12,297,596 tons) in 1949–50. In the continental U. S., 903 grades were listed by their guaranteed analysis. Eighty-nine of these comprised 95.3 per cent of the total quantity consumed. These 89 grades are listed in Table 2, with quantities consumed in 1950–51 and 1949–50.

The 3–12–12 grade, leading all other grades in amount consumed (1,841,928 tons), comprised 13.5 per cent of the total quantity of mixtures in continental U. S. Consumption of this grade in 1949–50 was 1,221,725 tons. Distribution is principally in the North Central region.

The 5-10-5, 3-9-6, 3-12-6 and 4-10-6 grades were sold in next largest quantities in the order named. The total of these five

High-analysis fertilizer + Ammonium Sulphate pay off in high seed corn quality and increased yield for Seem Seed Co., Zionsville, Pa.

● Joseph T. and Benjamin L. Seem, operating the Seem Seed Co. at Zionsville, Pa., are thoroughly sold on the performance of Ammonium Sulphate, both in high-nitrogen complete fertilizers and as a supplementary nitrogen material for direct application.

In their hybrid seed corn operations, the Seem Brothers plow down 700 to 800 lbs. of a 10-10-10 or its equivalent to improve the nutrient level of the soil. At planting time, they add an application of 100-150 pounds of 10-10-10 in the rows. When the crop is well along, the Seem Brothers now also side dress with 300-500 pounds of Ammonium Sulphate as a direct application.

This scientific fertilization program with Ammonium Sulphate has increased the average seed corn yield from a previous 60 bushels per acre to 100 bushels. In addition, test weights are higher and seed quality is excellent.

The Seem Brothers report equally good results from the use of Ammonium Sulphate on seed wheat and barley. From an investment standpoint, the return from the increased yield is many times over the fertilizer cost.



BENJAMIN L. SEEM

JOSEPH T. SEEM

Bigger yields for farmers mean better business for you

• As more and more farmers turn to U·S·S Ammonium Sulphate—in high-nitrogen fertilizers and for direct application—to increase both the quantity and quality of their crops, demand goes up and up.

Be ready to meet this demand by using U·S·S Ammonium Sulphate to supply a major part of the nitrogen content in your high-

nitrogen complete fertilizers. And supplement your line by selling U·S·S Ammonium Sulphate in 100-pound bags for direct application.

For complete information on U·S·S Ammonium Sulphate, contact our nearest sales office or write directly to United States Steel Company, 525 William Penn Place, Pittsburgh 30, Pa.

U-S-S AMMONIUM SULPHATE



2-99

UNITED STATES STEEL

TABLE I

Consumption of Commercial Fertiliser Mixtures and Separate Materials Year Ended June 30, 19511/

	Com	mercial Yixtu	res	Sepi	rate Materia	als	All Fertilizers	Relative C 1949-50	
State & Region	July 1 - Dec. 31, 1950	Jan. 1 - June 30, 1951	1950-51 Year Total	July 1 - Dec. 31, 1950	June 30, 1951	1950-51 Year Total	1950-51 Grand Total	All Fertilizers 2/	Total N. Avail. P205, & K2
	Tons	Tons	Tons	Tons	Tona	Tons	Tons	Percent	Percent
4-4	15,827	137,106	152,933	5,015	7,000	12,015	164,948	77	78
Maine New Hampshire	2,843	14,162	17,005	3,214	6,231	9,445	26,450	94	95
Vermont	5,945	26,473	32,418	9,104	21,508	30,512	63,030	100	98
Massachusetts	10,394	63,060	73,454	6,293	15,803	22,096	95,550	107	113
Rhode Island Connecticut	1,547	12,658	14,205	577 9,315	2,954	3,531	17,736 88,953	99 94	93 98
New England	5,538	49,705 303,164	55,243 345,258	33,518	77,891	111,409	456,667	90	90
New York	83,911	358,680	442,591	54,454	129,854	184,308	626,899	103	105
New Jersey	47,125	185,433	232,508	8,176	16,895	25,071	257,679	109	111
Pennsylvania	147,375	371,423	518,798	33,845	72,740	106,585 3,078	625,383 67,269	99 117	102
Delaware District of Columbia	15,029	1,230	1,474	851 257	2,227	719	2,193	113	98
Maryland	74,357	169,809	244,166	12,964	18,656	31,620	275,786	110	111
West Virginia	11,361	51,892	63,253	9,417	28,404	37,821	101,074	97	99
Middle Atlantic	379,402	1,187,679	1,567,081	119,964	269,238	389,202	1,956,283	103	106
Virginia	176,359	500,423	676,782	44,672	109,943	154,615	831,397	113	116
North Carolina	304,991	1,226,733	1,531,724	99,289	268,213	367,502	1,899,226	109 110	111
South Carolina Georgia	131,527	547,547 889,590	679,174 1,036,059	76,214 85,033	204,099 190,862	280,313 275,895	959,487 1,311,954	111	117
Florida	345,740	571,532	917,272	35,113	49,977	85,090	1,002,362	114	120
South Atlantic	1,105,186	3,735,825	4,841,011	340,321	823,094	1,163,415	6,004,426	111	114
Ohio	316,861	568,796	885,657	26,060	40,011	66,071	951,728	105	112
Indiana	250,810	569,338	820,148	50,470	64,031	114,501	934,649	117	124
Illinois	124,705	313,168	437,873	415,290	323,745	739,035	1,176,908	135	145
Michigan	156,058	301,421	457,479	16,753	31,407	48,160	505,639	107	113
Wisconsin	74,920	291,628	366,548	16,069	27,818	43,887	410,435	116	121
East North Central	923,354	2,044,351	2,367,705	524,542	487,012	1,011,654	3,979,359		99
Minnesota Iowa	31,913	120,470 199,957	152,383 242,358	16,876	31,728	48,604 143,692	200,987 386,050	92 116	122
Missouri	119,915	267,068	386,983	101,156	149,190	250,346	637,329	156	149
North Dakota	1,564	8,662	10,226	1,147	2,832	3,979	14,205	76	87
South Dakota	730	3,470	4,200	1,368	3,152	4,520	8,720	160	172
Nebraska Kansas	3,283	14,630 34,472	17,913 70,564	14,087	35,857 43,410	49,944 115,086	67,857 185,650	155 116	145
West North Central	235,898	648,729	884,627	248,813	367,358	616,171	1,500,798	127	125
Kentucky	65,226	349,365	414,591	59,636	85,988	145,624	560,215	101	102
Tennessee	64,787	324,282	389,069	74,149	85,087	159,236	548,305	108	112
Alabama	137,423	691,646	829,069	205,736	270,255	475,991	1,305,060	114	117
Mississippi	33,188	297,147	330,335	243,021	219,378	462,399	792,734	124	117
East South Central	300,624	1,662,440	1,963,064	582,542	660,708	1,243,250	3,206,314	113	113
Arkansas	23,156	190,610	213,766	51,813	117,685	169,498 150,327	383,264 324,787	120 118	126 126
Louisiana Oklahoma	25,651 15,323	148,809 51,195	174,460 66,518	55,187	95,140	79,680	146,198	103	109
Texas	65,013	217,141	282,154	196,862	130,593	327,455	609,609	110	113
West South Central	129,143	607,755	736,898	344,491	382,469	726,960	1,463,858	114	119
Montana	431	1,834	2,265	6,358	12,222	18,580	20,845	191	173
Idaho	413	7,015	7,428	11,736	26,127	39,863	47,291	94	104
Wyoming Colorado	128 3,392	15,582	753 18,974	1,475	4,076	5,551	6,304 50,781	130	138
New Mexico	201	1,694	1,895	5,866	13,988	19,854	21,749	111	102
Arizona	5,568	22,094	27,662	31,239	45,279	76,518	104,180	190	193
Utah Nevada	212 54	2,118	2,330	14,083	12,200	26,283 874	28,613	185 107	176
Mountain	10,399	51,149	61,548	81,444	137,886	219,330	280,878	143	143
Washington	4,915	24,317	29,232	23,688	33,327	57,015	86,247	105	121
Oregon	4,876	19,299	24,175	51,353	48,987	100,340	124,515	132	125
California	80,685	139,122	219,807	518,904	709,864	1,228,768	1,448,575	130	131
Pacific	90,476	182,738	273,214	593,945	792,178	1,386,123	1,659,337	128	129
Continental U. S.	3,216,576	10,423,830	13,640,406	2,869,680	3,997,834	6,867,514	20,507,920	113	116
Hawaii	25,438	28,174	53,612	37,016	35,827	72,843	126,455	110	102
Puerto Rico Alaska	142,418	141,307	263,725	33,586	36,538 409	70,124	353,849 516	141	140
Territories	167,856	169,568	337,444	70,602	72,774	143,376	480,820	131	126
Total U. S., 1950-51	3,384,432	10,593,418	13,977,850	2,940,282	4,070,608	7,010,890	20,988,7404/	114	116
1949-503/	2,648,560	9,649,036	12,297,596	2,261,020	3,784,684	6,045,704	18,343,3005/	100	100
1948-49	3,216,721	9,622,785	12,839,506	2,307,273	3,395,106	5,702,379	18,541,8856/	101	97

^{1/} Includes: ground phosphate rock, basic slag, minor element materials, such as borax, sulfur, manganese sulfate, etc. Used as separate materials, also fertilizers distributed by Government agencies. Does not include liming materials, but includes gypsum.

LS

^{2/} Materials not guaranteed to contain N, P205 or K20 excluded from these calculations.
3/ Revised.
4/ Includes 645,441 tons of minor and secondary element raterials, principally gypsum, n

DIRECT FEEDING ... with Monsanto soluble plant nutrients

Soluble plant-nutrient chemicals by Monsanto are being formulated into fertilizer solutions, providing direct feeding to plants of nitrogen, phosphorus and potassium without harm to leaf crops. Immediate solubility, when applied directly to plants, is a characteristic of solutions of Di Ammonium Phosphate, Mono Ammonium Phosphate, Mono Potassium Phosphate and Phosphoric Acid 75%. They also are available for dry applications.

Shipped in appropriate containers, these chemicals are being used by fertilizer manufacturers in processing specific formulations for soil dressing or direct-to-plant applications. Standard farm equipment is used for either spray or solid application. For information concerning this available supply of plant-nutrient chemicals, contact any District Sales Office, or write MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700-A South Second Street, St. Louis 4, Mo.

* * * *

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto Canada Limited, Montreal.

MONSANTO PLANT	NUTRIENT CHE	MICALS	
	H	P ₂ O ₅	K ₂ 0
Mono Potassium Phosphate (Crystals)	-0-	51.6%	34.2%
Di Ammonium Phosphate (Crystals)	21.0%	53.85%	-0-
Mono Ammonium Phosphate (Crystals)	12.2%	61.61%	-0-
Phosphoric Acid (75.0%) (Liquid)	-0-	54.5%	-0-



SERVING INDUSTRY... WHICH SERVES MANKIND

TABLE 2

Consumption of Mixed Fertilizers in the Continental United States, Year Ended June 30, 1951 by Principal Grades, with Comparison for Year Ended June 30, 1950

Grade		umption ed June 30.		n of Total	Grade		mption ed June 30,	Proportion Year Ender	
	1951	1960	1951	1950		1951	1950	1951	1950
	Tons	Tons	Percent	Percent		Tons	Tons	Percent	Percent
0-9-27	49,928	35,061	.37	.29	5-20-20	28,778	9,181	.21	.08
0-10-20	26.014	18,955	.19	.16	6-3-6	23,179	25,273	.17	.21
0-10-30	18,507	3,991	.14	.03	6-4-B	13,710	5,635	.10	.05
0-12-12	144,349	130,483	1.06	1.08	6-6-6	34.837	27,105	.26	.23
0-12-20	22,590	7,460	.17	•06	6-6-8	15,759	13,763	.12	11
0-14-7	142,509	132,808	1.04	1.10	6-6-9	29,080	16,286	.21	.14
0-14-10	115,829	119,836	.85	1.00	6-8-4	260,783	287,405	1.91	4.39
0-14-14	234.778	118,7201	1.72	.99	6-8-6	263,851	287,053	1.93	2.38
0-20-10	60,331	85,799	.44	.71	6-8-8	218,334	168,758	1.60	1.40
0-20-20	217,162	116,880	1.59	.97	6-8-12	54,544	38,154	.40	.32
2-12-6	588,484	879,784	4.31	7.31	6-9-6	10,261	9,892	•08	.08
2-12-12	321.012	198.765	2.35	1.65	6-9-12	41,963	59,412	.31	.49
2-14-8	14,874	16,240	.11	.13	6-10-4	53,975	53,004	.40	.44
2-16-8	28,764	34,510	.21	.29	6=12-6	41.443	25,982	.30	.22
3-8-5	20,044	24,546	.16	.20	6-12-12	80,257	30,806	. 59	.26
3-8-8	26,873	25,469	.20	.21	6=18=5	12,484	11,860	•09	.10
3-9-6	856,177	781,651	6.28	6.49	6-24-0	16,220	6,734	.12	.06
3-9-9	349,478	275.011	2.56	2.28	6-24-12	12,837	7,633	.09	.06
3-9-12	32,721	29,132	.24	.24	7-7-7	35,705	50,892	.26	.42
3-9-18	203,851	128,934	1.49	1.07	8=0=8	17,332	12,928	.13	.11
3-9-27				.05	8=8=4				
3-12-6	728,914	5,633	5.34	6.67	8-8-8	21,371	19,646	.16	.16
		803,325		10.15		146,855	89,392	1.08	
3-12-12	1,841,928	1,221,725	13.50	1.28	8=10=12	13,086	10,085	.10	.08
3-18-9	119,013	154,636	.97		8-12-16	20,534	29,484	.15	.24
4-6-6	15,984	12,210	.12	.10	8-16-16	38,573	38,432	.28	.32
4-6-8	85,714	82,103	.63	•68	8-24-8	37,859	12,860	.28	•11
4-7-5	118,855	118,366	.87	.98	8-32-0	26,889	11,517	.20	.10
4-8-4	14,022	16,016	.10	.13	10-0-10	30,094	15,468	.22	.13
4-8-6	584,507	559,931	4.29	4.65	10-6-4	28,249	26,324	.21	.22
4-8-8	264,408	221,469	1.94	1.84	10-10-0	24,025	18,641	.18	.15
4-8-12	83,850	72,036	.61	.60	10-10-5	42,591	38,067	.31	.32
4-9-3	83,010	81,701	.61	.68	10-10-10	71,596	32,071	•53	.27
4-10-6	618,461	622,372	4.53	5.17	10-15-8	12,851	10,194	.09	.08
4-10-7	465,310	386,671	3.41	3.21	10-20-0	60,377	33,714	.44	.28
4-12-4	364,131	432,923	2.57	3.60	10-20-10	11,909	6,590	•09	•05
4-12-6	12,809	15,054	.09	.13	12-0-10	14,624	8,011	.11	•07
4-12-8	243,398	276,994	1.78	2.30	12-12-12	15,627	4,338	.11	.04
4-12-12	33,067	20,514	.24	.17	12-24-12	11,826	1,035	.09	.01
4-16-0	51,186	53,999	•38	.45	14-0-14	19,400	11,446	.14	.10
4-16-8	46,828	45,617	.34	.38	15-8-4	11,706	7,303	.09	•06
4-16-16	121,899	44,080	.89	•37	17-7-0	31,700	21,433	.23	.18
4-24-12	65,092	62,263	•48	.52	89 mixtures	12,999,538	11.473.035	95.30	95.32
5-5-20	22,554	17,693	.17	.15	OS MIACUIOS	12,333,550	11,410,035	35.30	35.32
5-7-5	20,166	19,889	.15	.17	Other specified gradea2	554,154	498,438	4.06	4.14
5-8-7	26,531	31,031	.19	.26					
5-10-5	897,673	872,377	6.58	7.25	Not segregated	86,714	64,560	. 64	.54
5-10-10	585,839	446,741	4.29	3.71			,		
5-20-10	29,611	17,823	.22	.15	Total	13,640,406	12,036,0331/	100.00	100.00

1/ Revised.

2/ There were 903 in 1950-51 and 838 in the 1949-50 season.

grades was 4,943,153 tons or 36.2 per cent of the total for all mixtures in continental U. S. in 1950–51. The 2–12–6 grade, which was the leading grade from 1941 to 1949 and second highest in 1949–50, dropped to sixth place.

Principal Grades

The 15 principal grades distributed in each region during the current fertilizer year are listed in Table 3, with their consumption in each of the respective states of the region. For most of the states these 15 grades represent 80 per cent or more of total consumption in the state. A number of exceptions occur, however, particularly in the

West North Central, Mountain and Pacific regions. Nevertheless, with the exception of Florida and Nevada, these grades represent more than 50 per cent of total consumption in the state.

The same 15 grades comprise the list as in 1949–50, except for one or two changes in each region. The 10–10–10 grade, for example, appears on the list for New England instead of 4–12–4. The listing in order of consumption is somewhat different. Grades moving up in the list generally were those with a higher analysis.

Of the mixed fertilizers sold in 1950–51, 12,521,867 tons or 89.6 per cent were N-P-K mixtures. As may be seen from Table 6, the next

most important group was the P-K mixtures which comprised 1,091,-392 tons or 7.8 per cent of all commercial mixtures. With the N-P-K mixtures they constitute 97.4 per cent of the total. N-P mixtures and N-K mixtures, respectively, sold in next largest tonnage. Order of consumption of these four classes remained the same as in 1949–50.

Nutrient Content

Weighted average nutrient content of commercial mixtures consumed in the United States increased from 23.24 per cent in 1949–50 to 24.19 per cent in 1950–51 (Table 4). This average, in 1950–51, comprised nitrogen

TABLE 3

Consumption of Mixed Partilleers, By Grades, in Each State and Region, Year Ended June 50, 1951

State						Fifteen	Fifteen Principal Grades Consumed in the Region Tons	Grades Cons	and and and and	negron e						Number 1	Numberly Tons	Total
								New R	New England									
	6-10-10	6-9-12	0-14-14	5-8-7	6-3-6	8-12-16	0-50-50	8-16-16	7-7-7	5-10-5	6-6-9	8-12-12	5-7-10	10-10-10	8-9-10			
Meine New Hampshire	23,113	41,470	15,3902/	1,054	0 🕶	20,205	102	5,357	908	1,007	8,869	6,311	6,072	346	3,349	36	15,596	152,933
Vermont	7,279	0	8,394	744		162	5,223	4,286	911	169	0	164	0	923	0	63	3,751	32,418
Massachusetts Rhode Island	15,480	00	1,188	10,276	8,087	* 0	4,750	2,870	6,503	1,167	00	418	00	1,675	00	23 82	9,348	73,454
Connecticut	7,819	0	1,269	7,886	15,06	0	2,859	1,166	3,085	2,723	0	096	0	930	0	51	11,458	55,243
Total	63,103	41,470	38,943	26,526	23,179	20,480	15,625	15,411	12,276	11,442	8,869	8,265	6,072	4,344	3,349	89	44,906	346,258
								Widdle	Atlantic									
	3-12-6	5-10-10	5-10-5	4-12-8	4-8-12	0-50-50	6-12-6	0-14-7	4-12-4	3~8~12	10-10-10	0-14-14	4-12-12	0-12-12	7-7-7			
New York	40,375	95,457	161,028	5,622	20,	14,466	28,954	1,078	8,328	1,390	15,136	3,504	14	180	4,067	2	42,622	442,591
Now Jersey	10,598	115,488	26,254	19,613	13,402	3,729	3.227	12.820	12.246	13,606	1,431	5,910	18.292	2,666	8,543	4 L	19,380	518, 798
Delaware	16,692	15,813	3,002	5,569		670	0	767	75	3,718	398	2,135	7.1	2,026	46	22	9,548	64,191
Maryland	106,016	15,821	19,997	14,664	27,225	941	000	7,103	1,185	6,081	588	3,277	97	5,477	2,178	1000	54,616	244,166
Total	439 874	342 598	243 386	AR A78	RR 227		30 605	82 226	30.495	26.288	25.300	19.936	18.709	17.906	19.857	121	157 686	1 647 081
								2	Atlantio									
	3-8-8	4-10-6	4-8-6	3-9-9	2-12-12	3-12-6	4-8-8	-	6-8-6	0-14-14	4-7-5	4-6-8	4-9-3	5-10-10	3-12-12			
Virginia	77,054	14,124	00	3,960	131,604	157,754	0	61,876	22,772	57,935	00	00	4,065	15,458	80 (66	130,172	676,782
South Carolina	475,258	255,232	00	161 172	149,559	17 895	1,5591	40,442 63 835	7,610	968	00	0	100 0 0 F	4 400	47.739	10	25,255	4,551,724
Georgia	54,046	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	635,288	93,181	19,594	3,206	100,684	7,753	67,790	627	0 0 118.826	0 0 0	5,379	6,860	4,854	9 9 9	153,724	1,036,059
Total	691,726	618,347	584,485	346,547	301,105	268,583	210,407	174,677	147,776	123,046	118,826	85,695	83,009	80,381	53,649	999	952,952	4,841,011
								East North	ch Central									
	3-12-12	2-12-6	0-50-50	3-9-18	3-18-9	4-16-16	0-12-12	4-12-8	5-10-10	0-9-27	0-20-10	8-8-8	10-10-10	2-16-8	5-20-20			
Ohio	468,187	192,520	19,283	4,700	37,181	2,572	22,625	20,804	48,027	662	2,264	5,966	3,614	0 46	3,922	59	53,530	885,657
Illinois	251,599	12,565		40,103	4,931	25,415	8,914	16,524	9	6,521	5,292	8,740	8,495	0	000	47	37,784	437,873
Wichigen Wisconsin	162,423	69,924	43,806	14,626	5,683	17,846	11,423	10,526	454	19,778	3,787	3,484	2,666	28,661	194	51	28,411	457,479
Total	1,586,338	365,505	128,496	118,845	109,636	89,807	010,69	66,899	55,120	40,690	40,275	33,088	29,284	28,685	18,715	66	187,312	2,967,705
								West North Centra	Central									
	3-12-12	4-15-4	2-12-6	4-24-12	4-16-0	10-20-0	8-24-8	4-16-16	0-50-50	3-9-18	8-32-0	4-12-8	8-8-8	4-16-8	0-50-10			
Minnesota	23,916	25	0	25,452	42	911	10 5	22,525	15,720	266	1,291	0	30	4,126	13,178	55	44,898	152,383
Missouri	56, 604	109,194	54,687	25,445	1,624	4,767	50,492	280	11,102	24,182	916	3,580	22,920	18,144	2,202	18	40,306	386.983
Worth Dakota	727	10	28	2,527	62	70	0 0	940	183	0 +	1,174	0 %	0 9	88 0	266	200	4,164	10,226
Sebreska Ganses	1,021	15,042	7,525	111	1,603	6,679	264	00	75	1300	5,065	8 1 8	701	16	316	23 23	7,860	17,913
	040 040	300 430	60 mb4	69 640	46 990	40 406	45 641	80 001	000 00				-					

		4-10-7	San Pard	5-10-5	0 0	2.0.8	3-21-C	300	0-14-10	6-19-19	A-19-R	8-8-8	0-14.34	4-15-4	0-19-19	8-12-12			
California Cal				0-04-0	0-0-0	0.000	0-25-0	0=0=0	20-14	24-44-0	0-25-6	0-0-4		107-6	0-46-46	0-45-45			-
Column C	ntucky nnessee stams seissippi	421,866 2,095	0 10,995 216,574 27,451	975 7,299 5,167 165,285	10,635 55,413 111,525	50,309 114,047 0	95,091 17,001 0	97,358 5,240 54	64,593	2,386 52,886 0	48,617 5,146 0	753 51,834 72 0	2,526 1,269 38,307 4,951	8,026 32,482 58 0	18,741 20,342 0 5	26,407	46 54 22 17	63,397 53,395 27,966 17,396	414,591 389,069 829,069 380,335
Scale Scal	Total	454,001	254,018	178,726	177,577	164,356	112,092	102,696	66,181	55,271	53,762	52,659	47,063	40,566	39,088	32,865	73	162,153	1,963,064
Second									West Soul	th Central									
Column C		5-10-5	4-12-4	8-8-8	3-9-18	6-8-12	0-14-7	3-12-12	6-10-4	8-8-9	12-12-12	4-12-8	12-24-12	10-20-10	6-12-6	10-10-0			
Second S	kanese	65,067	18,697	4,648	51,185	48,509	1,279	1,411	3,265	12,679	4,096	11,039	969	3,634	38	121	19	13,367	213,766
10-10-2 1-4-10-2	lehome	28,621	21,180	15,092	1,519	36	1,120	148	957	79	197	0 89	561	263	1,647	28	25	9,604	66,518
10-10-0 1,4820 863 1,580 863 963	Total	272,474	110,031	56,046	52,678	51,332	44,183	20,288	14,212	13,198	12,275	11,082	9,038	8,733	8,456	7,069	17	45,803	736,898
10-10-0 10-20-0 10-16-8 14-6-0 10-18-5 12-24-0 6-30-0 10-10-5 10-10-10 6-10-4 7-21-7 14-7-0 14-17-7 10-12-18 6-24-6 14-84 1-24-4									Mou	ntain									
Part		10-10-0	10-20-0	10-16-8	14-6-0	10-18-5	12-24-0	6-30-0	10-10-5	10-10-10	6-10-4	7-21-7	14-7-C	14-14-7	10-12-18	6-24-6			
10-10-6 1, 20 65 1, 20 65 1, 20 65 1, 20 65 1, 20 65 1, 20 65 1, 20 65 1, 20 65 1, 20 65 1, 20 65 1, 20 65 1, 20 65 1, 20 65 1, 20 1	ntens	0	1,488	25	0	135	0	351	20	0	0	0	0	0	0	0	89	246	2,265
13,429 35, 3,979 0 2,766 3,146 547 210 368 441 1,143 0 0 0 1,002 968 30 1,004 1,004 1,044 1,143 0 0 0 1,002 968 30 1,004	aho	2, 663	1,290	863	00	146	00	756	938	00	27	00	00	00	00	00	21	745	7,428
13,429 1,425 1,425 1,425 1,425 1,425 1,425 1,425 1,425 1,1	lorado	~	953	3,979	0	2,766	3,146	547	210	368	441	1,143	00	00	1,002	896	30	3,449	18,974
And the color of t	w Mexico	749	143	00	à	00	00	00	35	0 490	171	00	0 000	0 0 0	00	00	13	797	1,895
Table 13,429 11,860 4,932 3,502 3,240 3,146 2,079 1,709 1,422 1,889 1,173 1,059 1,021 1,002 968 77 1,064 1,125	e.h	24	435	900	3	52	0	423	17	0	642	30	0	40	0	0	13	567	2,330
13,429 11,850 4,932 3,502 3,140 2,079 1,709 1,422 1,289 1,173 1,089 1,021 1,002 986 77	wada	0	100	0	0	0	0	0	11	0	0	0	0	0	0	0	11	130	241
10-10-5 17-7-0 6-8-4 6-10-12 15-6-4 6-10-10 6-9-6 10-16-9 4-10-10 10-10-10 10-20-0 6-20-20 10-112-10	Total	13,429	11,860	4,932	3,602	3,240	3,146	2,079	1,709	1,422	1,289	1,173	1,059	1,021	1,002	958	77	9,627	61,548
10-10-5 17-7-0 6-8-4 6-10-12 16-6-4 6-10-10 6-9-6 10-16-9 4-10-10 10-10-10 10-20-0 6-20-20 10-112-10									Pac	offic									
### 15 1.5		10-10-5	17-7-0	8-8-4	6-10-4	8-10-12	15-8-4	5-10-10	9-6-9	10-16-8	4-10-10	10-10-10	10-20-0	6-20-20	10-10-0	10-12-10			
	shington	1961	0 1	0	5,148	0	0	7,897	0	1,748	46	150	099	1,712	13	0	20	12,891	29,232
Total 38,558 31,437 20,508 18,387 13,084 11,620 10,511 9,733 7,305 6,200 5,513 4,716 3,513 3,404 2,822 388 14-6-10 12-6-10 12-4-10 14-4-10 7-8-10 15-4-7 15-3-12 14-6-8 15-3-12 16-6-7 10-10-5 12-6-16 12-6-16 10-10-8 The makes of mixtures are lacilided in the totals.	lifornia	37,257	51,434	20,505	13,476	13,084	11,620	0 0	9,732	586	6,150	5,347	2,806	0 0	3,014	2,822	322	61,974	219,807
14-6-10 12-6-10 12-4-10 14-4-10 15-4-7 13-3-12 14-6-8 15-3-12 19-4-7 10-10-5 12-6-8 6-9-10 12-6-14 10-10-6	Total	38,559	31,437	20,505	18,387	13,084	11,620	10,511	9,733	7,305	6,200	5,513	4,716	3,813	3,404	2,822	388	85,006	273,214
### 14-6-10 12-6-10 12-4-10 14-4-10 15-4-7 13-3-12 14-6-8 15-3-12 19-4-7 10-10-5 12-6-8 6-9-10 12-6-14 10-10-8 #### 17-84 40,607 30,500 20,313 17,869 17,251 16,854 15,365 11,891 6,677 7,944 7,451 3,572 3,344 3,256 30 ###################################									Terri	tories3/									
erto Rico 43,794 40,607 30,500 20,313 17,969 17,261 16,365 11,891 ,8,677 7,944 7,451 3,572 3,344 5,256 30 The number of mixtures shown for each State and Segion is seclusive of mixtures not appeified by grade, mithough the tonnages of such mixtures are included in the totals.		14-6-10	12-6-10	12-4-10	14-4-10	7-8-10	15-4-7	13-3-12	14-6-8	15-3-12	18-4-7	10-10-5	12-6-8	6-8-10	12-6-14	10-10-8			
	erto Rico	43,794	40,607	30,500	20,315	17,969	17,251	16,854	16,365	11,891	8,677	7,944	7,451	3,572	3,344	3,256	30	34,837	283,725
	The number of mix	ttures shown i	Tor each St	ate and Reg	ion is excl	m Jo eaten	fatures no	t specifie	i by grade,	. although	the tonnage	s of such m	ixtures are	included i	n the tota	10.			
		sport this gre	de me rep	orted to be	23,579 ton	a. It sho	uld have b	sen 12,245	tons.										

4.18, available $P_2O_{\bar{b}}$ 11.03 and K_2O 8.98 per cent. Value of these nutrients respectively are 0.16, 0.10 and 0.69 higher than in 1949–50. Although average nutrient content of mixtures selling in most of the states increased there were exceptions in Arizona, Oklahoma, New Mexico and the New England states except Massachusetts and Connecticut.

Average nutrient contents, especially potash, have increased remarkably since 1935–39. The five year average nutrient contents of mixtures for 1935–39, as given in agricultural statistics, have changed from 1935–39 in 1950–51 as follows: nitrogen 3.65 to 4.18, available P_2O_5 9.36 to 11.03 and K_2O 5.88 to 8.98 per cent. Percentage increase of these nutrients was 14.5, 17.8 and 52.7, respectively. Average nutrient ratio changed from 1–2.56–1.61 in 1935–39 to 1–2.64–2.15 in 1950–51.

Materials

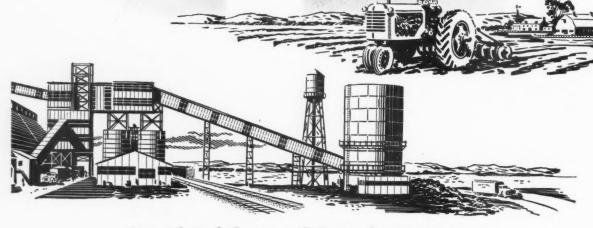
In addition to mixed fertilizers agriculture used also in 1950–51 7,010,890 tons of materials for direct application to the soil or for farm mixing. This is 965,186 tons more than used in 1949–50. Quantities of materials used are given in Tables 5 and 6.

Classes of materials consumed are in order of tonnage, phosphates, 3,490,350 tons (49.8 per cent); chemical nitrogen materials, 2,304,500 tons (32.9 per cent); minor and secondary element materials, 645,441 tons (9.2 per cent); organics, 318,879 tons (4.5 per cent) and potash materials, 251,720 (3.6 per cent).

Net increases in consumption over 1949-50 were as follows: chemical nitrogen materials 518,-596, minor and secondary element materials 205,934, phosphates 132,-139, potash materials 82,821 and organics 25,696 tons. Chemical nitrogen materials showing highest proportional increases were calcium nitrate, ammonium sulfate and ammonium nitrate-limestone mixtures. Principal source of calcium nitrate was Norway. Imports from June, 1950 to May, 1951 were 44,402 tons. Its use in California, as well as in a number of other states, is growing. Consumption of



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22

FARM CHEMICALS

TABLE 4

ammonium sulfate and ammonium nitrate-limestone mixtures more than doubled in many states. Greater interest was shown in anhydrous ammonia for direct application. Its use was recorded in 23 states. This is four more than in 1949–50 and 13 more than in 1948–49. Large consumption of gypsum in California was the reason for the higher total use of the minor and secondary element materials.

The use of ammonium phosphate (16–20) increased in states west of the Mississippi, where this material is more generally consumed. Principal consumption of phosphate rock was in Illinois and Missouri. These states consumed 74.2 per cent of the total in 1950–51 and 70.5 per cent in 1949–50. Most of the increase in use of basic slag was in Alabama. Distribution of superphosphate for direct application decreased 348,653 tons (16.4 per cent) compared with 1949–50.

Direct application of 50 and 60 per cent muriate of potash increased from 109,289 tons in 1949–50 to 189,838 tons in 1950–51. Such use for other potash materials was approximately the same as in 1949–50 except for manure salts and the sulfate. Consumption of manure salts decreased from 18,775 tons in 1949–50 to 8,440 tons in 1950–51, whereas sulfate increased from 13,902 to 18,703 tons in the respective years, reflecting the trend toward use of more concentrated potash materials.

Nutrients

Commercial fertilizers contained 4,728,155 tons of nutrients in the year ended June 30, 1951. This consisted of 1,238,234 tons of nitrogen, 2,110,127 tons of available phosphoric oxide (P₂O₅) (total phosphoric oxide was 2,537,162 tons) and 1,379,794 tons of potash (K2O). These tonnages, by states, are given in Table 7. Quantities contained in all fertilizers consumed in the United States for two earlier years is shown at the bottom of the same table. The 1950-51 figures for N, available P2O5 and K2O are 23.2, 8.2 and 25.1 per cent larger, respectively, than those for 1949-50; and 34.6, 8.7 and 28.6 per cent larger than for 1948-49. 1950-51 total quantity of nutrients

Weighted Average Plant-Mutrient Content of Commercial Mixtures Consumed in the United States, Year Ended June 30, 1951, and 1950 Total

	Ye	ear Ended Jun	30, 1951		Year Ended
State & Region	Nitrogen	Available Phosphoric Oxide	Potash	Total	June 30, 195 Total
	Percent	Percent	Percent	Percent	Percent
aine	5.85	10.94	12.55	29.34	29.51
lew Hampshire	3.51	13.28	13.01	29.80	30.71
/ermont	3.45	14.06	14.07	31.58	33.47
lassachusetts	4.83	10.44	10.75	26.02	24.41
thode Island	4.99	10.20	9.55	24.74	26.13
Connecticut	5.57	8.70	8.80	23.07	
New England	5.21	10.85	11.61	27.67	27.91
lew York lew Jersey	5.01 4.74	11.52	9.66	24.77 25.09	24.27
Pennsylvania	3.81	12.41	8.47	24.69	23.90
Delaware	3.79	10.81	9.50	24.10	23.69
District of Columbia	5.50	9.84	6.04	21.38	24.94
daryland	3.58	11.53	8.18	23.29	22.89
West Virginia	2.99	13.18	8.75	24.92	23.44
Middle Atlantic	4.22	11.73	8.59	24.54	23.95
irginia	2.95	11.16	8.63	22.74	21.75
North Carolina	3.50	9.93	7.85	21.28	20.90
South Carolina Georgia	3.75	9.94	7.15	20.84	20.76
Florida	4.92	7.06	7.86	19.84	19.06
South Atlantic	3.82	9.31	7.71	20.84	20.19
Ohio	2.96	12.69	11.09	26.74	25.09
Indiana	2.94	12.73	12.70	28.37	26.77
Illinois	3.25	12.32	13.30	28.87	27.48
Michigan	2.65	13.66	11.50	27.81	26.71
Wisconsin	2.44	13.97	15.40	31.81	29.64
East North Central	2.89	12.95	12.46	28.30	26.63
dinnesota	3.35	19.05	14.13	36.53	35.17
Iowa	4.41	16.31	7.73	28.45	26.76
Missouri North Dakota	4.13 3.92	29.23	9.02	27.36	25.27 36.25
South Dakota	6.88	18.38	1.62	26.88	23.57
Nebraska	9.24	21.65	1.29	32.18	30.92
Kansas	6.26	18.58	3.25	28.49	26.30
West North Central	4.36	16.34	8.91	29.61	28.18
Kentucky	3.54	10.98	7.88	22.40	22.40
Tennessee	3.75	10.05	8.32	22.12	20.9€
Alabama	4.11	10.03	7.29	21.43	20.51
Mississippi	5.52	9.62	6.69	21.83	21.02
East South Central	4.16	10.17	7.52	21.85	21.07
Arkansas Louisiana	5.04	10.10	11.04	26.18	24.62
Oklahoma	5.54 4.76	10.70	7.23 5.22	23.47	22.39
Texas	4.94	11.64	5.74	22.32	21.25
West South Central	5.09	11.01	7.58	23.68	22.73
Montana	9,54	21.15	1.02	31.71	31.04
Idaho	9.80	15.21	2.91	27.92	27.20
Wyoming	10.76	19.79	5.05	35.60	32.32
Colorado	9.64	20.31	5.45	35.40	34.07
New Mexico	8.23	11.08	1.41	21.37	25.39
Arizona Utah	9.10	14.18	3.00	26.49 30.34	27.16 27.91
Nevada	7.88	14.52	3.73	26.13	24.92
Mountain	10.15	16.58	2.96	29.70	30.07
Washington	6.62	13.10	10.28	30.20	26.63
Oregon	8.03	15.12	8.80	31.95	30.65
California	10.26	10.29	5.36	25.91	25.47
Pacific	9.69	11.02	6.19	26.90	26.20
Continental U. S.	4.00	11.16	8.93	24.09	23.14
Hawaii	11.14	8.48	16.50	36.12	35.09
Puerto Rico	11.56	5.66	9.74	26.96	26.81
Alaska	9.47	17.39	10.58	37.44	
Territories	11.49	6.11	10.81	28.41	28.C8
27 0200	4.18	11.03	8.58	24.19	
U. S. Average: 1950-51 1949-50	4.02	10.93	8.29	23.24	1

TABLE 6

Principal Fertilizer Materials Consumed as such, by States and Regions, Year Ended June 30, 19511/

							Tons								
State & Region	Ammonium	Ammonium Sulfate	Calcium Cyanamide	Sodium Nitrate	Other Chemical Nitrogen	Dried Manures	Other Organics	Phosphate Rock2/	Superpho 18-20 Percent	30-50	Other Phosphates	Muriate of Potash 50 & 60%	Other Potash	Minor and Secondary Elements	Total
						-	-			10100110		00 00/5			
Maine	1,382	246	206	399	72	786	187	15	8,265	3	210	185	6	54	12,01
New Hampshire	411 317	462	38 15	182	89 60	129	252	63 205	7,964	0		141	52	18	9,44
Vermont Massachusetts	788	263	179	1,831	76	2,136	4.736	298	9,839	0		706	0	57	22,09
Rhode Island	26		15	163	52	319	934	30	1,617	0		50	3	5	3,53
Connecticut	414	252	85	1,344	149	938	14,814	316	8,979	34	1,646	1,762	2,222	756	33,71
New England	3,338	1,389	637	4,043	498	4,379	20,947	927	65,384	37	3,443	3,286	2,283	918	111,40
New York	6,873	638	1,077	6,506	611	2,974	5,952	1,415	157,260	68	936	643	48	307	184,30
New Jersey	1,535	329	2,336	3,161	320	2,616	1,802	773	8,676	6	1,982	1,200	214	133	25,07
Pennsylvania	1,673	1,464	1,473	2,313	292	3,814	4,790	2,342	84,145	60	1,636	566	41	1,976	106,58
Delaware District of Columbia	463	0	37	268	48	99	146	146	1,612	1 5	43	96	0	95	3,07
Maryland	804	71	682	2,494	317	956	270	1,084	23,764	3	395	455	70	256	31,62
West Virginia	454	349	1	1,441	108	196	121	160	33,582	1,253	62	78	0	14	37,82
Widdle Atlantic	10,823	2,856	5,606	16,269	1,696	10,870	13,314	5,919	309,090	1,396	5,149	3,039	373	2,802	389,20
Virginia	3.496	2,269	1.169	33,144	16,531	565	784	554	60,054	5,261	3,326	1,254	7,837	18,372	154,€1
North Carolina	13,181	3,205	12,091	167,594	60,216	673	3,137	1.144	42,620	2,215	11,382	11,104	4.082	34,858	367,50
South Carolina	24,402	5,397	2,677	100,260	44,733	268	562	1,036	66,540	23	10,242	15,957	5,745	2,471	260,31
Georgia	16,143	1,743	1,280	94,118	19,161	808	747	1,100	74,983	1,176	30,190	14,008	3,713	17,725	275,89
Florida	3,408	2,043	2,234	13,236	8,357	1,025	6,368	7,289	16,494	56	4,230	4,392	12,876	3,082	85,09
South Atlantie	59,630	14,657	19,451	408,352	148,998	3,339	11,598	11,123	260,691	8,751	59,369	46,715	34,253	76,508	1,163,41
Ohio	6,282	6,435	3,148	1,446	913	1,641	5,782	8,880	27,484	1,915	1,007	871	191	76	66,07
Indiana	32,001	3,302	2,644	1,155	2,313	430	1,747	44,543	17,922	4,230	527	3,251	297	139	114,50
Illinois Michigan	24,025 6,413		941 309	592	7,473	1,034	6,610	601,219 3,317	44,893	4,660	2,834	32,004	1,101	491	739,03
Wisconsin	8,011	477	309	2	15.8	568	3,298	22,265	3,860	216	444	3,954	269	342	43,88
East North Central	76, "32	21,999	7,045	3,968	11,435	7,302	24,542	680,244	114,785	13,612	6,114	40,943	1,858	1,075	1,011,65
							-			-					
Minnesota Iowa	5,053	234	30 526	0	124 2,610	1,207	1,222	5,120 30,265	15,694 66,175	14,243	4,540 9,675	219	0	51 36	48,60
Missouri	21,010	2,861	186	394	9,721	477	1,944	170,255	23,897	8,447	2,391	5,193	212	0	250,34
North Dakota	314	3	0	0	1	0	20	120	272	2,316	672	29	0	232	3,97
South Dakota	618	312	60	0	20	15	35	170	2,030	940	298	22	0	0	4,52
Sebraska	16,017	8,999	100	0	10,741	216	196	792	4,352	7,109	1,459	153 119	0	0	49,94
Kenass.	23,374		60	1,131				19,097	12,302	44,101	9,756			-	115,08
West North Central	91,184	18,902	962	1,525	23,578	1,986	6,012	225,819	126,722	82,206	28,791	7,953	212	319	616,17
Kentucky	22,951	812	2,526	1,850	392	342 391	234	25,489	65,699	10,652	4,896	3,120	6,618	43	145,62
Tennessee Alabama	24,821	4,579	1,425	16,366	4,240 5,960	418	658	1,734	51,889 90,669	10,278	36,045 201,757	7,954	2,972	1,333	159,23 475,99
Mississippi	93,408	45,695	6,740	63,478	45,679	29	85	4,857	57,932	566	118,343	25,241	336	10	462,399
East South Central		51,308	13,249	194,719	56,271	1,180	1,201	33,574	266,189	22,135	361,041	46,660	11,930	1,627	1,243,250
		-		-		29	-			-		-	-	-	
Arkansas Louisiana	39,212	8,029	5,971 1,790	20,707	21,063	150	90	1,712 8,476	41,935	2,772	6,548	18,435 7,350	3,085	5	169,49
Oklahome	4,507	4,511	30	127	58	210	336	30,089	35,389	4,271	2,804	1,369	I	1 0	79,680
Texas	22,109	14,980	797	2,763	6,225	943	1,614	38,046	148,119	23,907	60,145	1,632	76	6,099	327,45
West South Central	90,777	28,009	8,588	51,616	50,331	1,332	2,040	78,323	255,126	32,611	89,947	28,786	3,370	6,104	726,960
Montana	2,580	3.099	0	0	150	0	102	40	40	10.362	1,551	5	0	651	18,580
Idano	2,885		40	0	0	0	0	454	14,146	11,850	276	61	0	2,463	39,86
Myoming	60	410	0	0	0	0	69	54	1,313	3,565	0	0	0	80	5,55
Colorado	5,025		8	32	2,502	92	679	0	3,415		1,548	162	58	435	31,80
New Mexico Arizona	1,120	1,612	698	1,701	1,473	35 825	180	50	2,266 5,516	6,490	6,216	110	423	2.792	76,51
ltan	4,078	10,514	0.00	1,101	150	25	60	163				193	5	361	25,28
Nevada	0		0	0	0	0	15	40	49		1	0	0	271	67
Mountain	26,270	38,933	946	1,733	28,193	977	1,285	801	32,170	53,442	26,188	551	486	7,355	219,33
Weshington	8,729		109	377	7,195	1,560	3,109	492	11,696	1,345	5,151	1,512	13	3,616	57,01
Oregon	14,644	30,272	518	181	4,785	517	896	360	23,231	4,108	14,719	1,515	93	4,501	100,34
California	70,524	135,668	7,195	933	116,142	150,0003/	50,405	409	67,984	16,581	67,082	1,568	3,552	540,525	1,228,76
Pacific	93,697	175,051	7,822	1,491	128,322	152,077	54,410	1,261	102,911	25,034	86,952	4,595	3,658	548,642	1,336,12
Continental U. S.	634,797	353,104	64,206	683,716	449,322	183,442	135,349	1,037,991	1,533,068	239,204	666,994	182,546	58,423	645,350	6,007,51
	3,259			78	5,338	8	80	1,633	656	1	8,446	6,578	3,377	91	72,64
Hamaii Puerto Rico	3,259		0	1 78	2,150	0	80	1,653	154	1 17	1,967	657	82	1 0	72,64
Alaska	120	1 10	. 0	3	1	, 0	0	0	0	180	40	55	0	0	40
Territories	3,379	-	16	84	7,489	8	80	1,633		198	10,453	7,290	3,459	91	143,37
	-			1			+			-	677.447	-	-		-
Total: 1950-51 1949-50	638,176 577,562		64,222	683,800		165,219	135,429	1,039,624	1,533,877		487,026	189,838	61,882	645,441 439,507	6,045,704
1949=50	347,223		63,985	700,045		134,681	123,744		1,784,719		472,546	95,108	80,504	509,565	5,712,379
	0220						1		., .,	,		,,,,,,		, , , ,	

Includes distribution by Government agencies, materials for mixing on the ferm, and gypsum. Excludes agricultural lime and materials used by manufacturers in the formulation of commercial mixtures. Consumption of each commodity is shown, by regions, in Table 6.
Includes colloidal phosphate, the quantity of which is shown separately, by regions, in Table 6.

Estimated.

increased 16 per cent whereas quantity of fertilizers supplying these nutrients increased only 14 per cent. This reflects the trend toward higher analysis fertilizers further evidenced by increasing nutrient content of commercial mixtures as shown in Table 4.

Although a larger consumption of nutrients was recorded for the United States in 1950-51, consumption in a number of states was less than for 1949-50. The percentage increase or decrease in nutrient consumption in 1950-51 compared with 1949-50, by states, is shown in Figure 2. States consuming less nitrogen used a total of 39,880 tons in 1949-50 and 35,866 tons in 1950-51, a decrease of only 4,014 Similar comparisons for tons. P2O5 and K2O show decreases of only 22,760 and 6,225 tons, respectively.

LITERATURE CITED

- (1) Walter Scholl and H. M. Wallace, Agricultural Chemicals, Vol. 6, No. 6, 31-37 (1951); Commercial Fertilizer, Vol. 82, No. 6, 21-22, 24-25, 27-28, 30-32 (1951).

 (2) U. S. Department of Agriculture, Agricultural Statistics 1947, Table 663, page 560.
- —, Agricultural Statistics 1947, Table 661, page 558.

TABLE 6

Commercial Fertilizers Distributed in the United States for Direct Use on the Land Year Ended June 30, 19511/

				Tor							
Commodity	New England	Middle Atlantic	South Atlantio	East North Central	West North Central	East South Central		Mountain	Pacific	Territories	Total
SIXTURES S-P-E grades H-P grades P-E grades H-E grades K-E grades K grades	288,200 307 56,751 0	1,456,284 108 110,247 13 429	4,439,415 2,060 269,418 106,958 23,160	2,642,719 478 324,508 0	686,335 127,034 71,243 17 0	1,751,925 594 210,025 520 0	673,461 16,438 46,999 0	24,294 37,202 52 0	230,912 40,177 2,125 0	328,324 2,096 24 7,000	12,521,867 226,494 1,091,392 114,508 23,589
OHEMICAL NITROUGH MATERIALS Ammonia - anhydrous Ammonia - anydrous Ammonia nitrate Ammonium nitrate-limostone mixtures Ammonium sulfate Calcium cymnamide Calcium nitrate Sodium nitrate Other4	0 0 3,338 261 1,599 537 18 4,043 219	3/ 0 10,823 602 2,856 5,506 0 16,269 1,094	3/ 0 59,630 136,714 14,657 19,451 5,953 408,352 6,331	3/ 76,732 6,153 21,999 7,045 1,697 3,968 3,585	3/ 0 91,184 7,843 18,902 962 100 1,525 15,635	3/ 0 182,148 17,936 51,308 13,249 6,532 194,719 31,803	3/ 3/ 90,777 17,469 28,009 8,588 626 51,616 32,216	3/ 3/ 26,270 1,960 38,933 946 4,299 1,733 21,934	3/ 93,897 3,473 175,051 7,822 35,425 1,491 89,424	3/ 0 3,379 0 108,387 16 39 84 7,450	118,423 17,659 638,176 192,431 481,491 64,222 54,689 683,800 73,609
RGANICS Blood, dried Castor pomace Compost and muck Cottonseed meal2/ Fish acrap and meal Hoof and horn meal Linseed meal Manures, dried Peanut meal Sewage sludge, activated Sewage sludge, other Soybean meal Tankage, animal Tankage, garbage Tankage, process Tung pomace Other	0 3,563 -0 8,760 974 119 1,995 4,379 70 4,184 0 775 4	122 11 0 6 1 0 10,870 0 9,141 0 0 558 0 3,183	3,339 39 4,437 0 20 60 462 2,814 60	0	0 0 0 0 0 0 1,986 0 6,012 0 0	0 0 59 0 0 0 1,180 0 0 1,142 0	0 0 0 1,532 0 2,040 0 0	0 0 0 0 0 0 0 977 0 0 0 0 0 0 0 0 0 0 0	1,009 832 0 57 1,034 0 152,077 0 11,333 38,249 0 140 800 593 0 363	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1,282 6,539 384 9,838 2,011 119 1,095 183,450 109 63,964 38,423 795 1,262 8,051 656
PHOSPHATES Ammonium phosphate, 11-48 Ammonium phosphate, 16-20 Ammonium phosphate, 13-39 Ammonium phosphate, 13-39 Ammoniated superphosphate Basic lime phosphate Calcium setaphosphate Pused tricalcium phosphate Phosphoria caid Phosphate rock Colloidal phosphate Precipitated bone Superphosphate, 19% 20% 20% 20% 42% 43% 44% 46% 46% 46% 46% 46% 47% 48% 48% 50% Other (16% P205)	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 6655 655 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 421 2,233 47,702 947 238 2,267 5,561 0 9,601 1,522 0 0 143,085 7,618 109,988 0 0 0 0 68080 0 0 264 5,588 6385 855 885 885 885 885 885 885 885 885	1,232 196 0 6 5 25 112 1,466 15,325 0 0 664,918 15,326 188 2,402 0 0 5 6,388 2,496 2	0 59 215,411 10,408 0 16,415 1,190 109,117 32 18,685 1,216 0 28,846 12,279 3,012 13,279 1,424 3,434	0 0 3595 342,317 112 1159 4,682 12,169 353 126,477 7,099 119,132 0 0 0 0 0 1,3777 1,533 1,259 11,366 4,201 4,201 4,201 4,201 4,201 4,201 4,201 4,201 5	60,737 4,595 3,734 0 16,966 1,595 1,595 0 0 7,688 7,685 7,685 0 0 0 254,337 1,667 0 0 0 27,284 264,337 1,667 890 1,342 4,747	20,466 2,080 101 0 0 2 1 1 0 0 2,545 801 0 0 20,818 7,144 4,208 239 38,002 1,005 40 8,309 5,116 5,49	66,022 2,817 0 1,978 450 450 7,030 811 450 0 24,619 9,289 69,033 0 4,724 232 0 1,788 0 1,788 0 1,788	4,453 0 0 1,945 0 0 0 0 0 0 1,633 0 0 0 0 0 0 0 1,633 0 0 0 0 1,633 0 0 0 0 1,633 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	17,261 187,651 13,680 9,683 2,597 407,055 6,163 7,892 16,804 17,730 9,987 42,728 42,728 42,728 41,115,588 3,0353 61,411 2,444 (75,374 23,077 5,403
POTASH MATERIALS Carbonate Cement flue dust Cotton hull ash Magnesia sulfate Manure salta, 22-30% Muriate, 50% Muriate, 60% Nitrate Phosphate ash Sodium nitrate Sulfate Tobacco stems Wood ashes Other	1,451 103 198 3,088 383 072 274	2,409	7,317 0 2,165 4,716 39,500 7,215 6,754 1,879 289 4,747 1,736 4,411	825 822 17,699 23,344 00 0	0 0 146 66 503 7,450 0 0	25 1,224 437 30,416 16,264 12 1,978 1,814 6,440	0 928 2,383 21,616 7,168 9 0 0	0 0 0 0 124 427 0 0 21	0 0 0 29 4,566 0 0 3,658	0 0 666 0 7,290 0 0 0 2,793	66 7,31' 1,47' 6,09' 8,44' 110,61' 779,22' 7,15' 3,86' 2,22' 18,70' 1,73' 4,41' 40'
MINOR AND SECONDARY ELEMENT MATERIALS Ammonium sulfate Borax Copper sulfate Iron sulfate Iron sulfate Land plaster (gypsum) Lime sulfur solution Magnesium sulfate Nanganese sulfate Soil sulfur, 28-99-% Sulfurfate oid, 40-93% Zinc sulfate Minerals not segregated TOTAL	72 8 0 746 0 57 15 11	11 207 29 0 2,321 0 1 42 90 0 5	2 219 39 0 73,715 0 0 84 490 0 15	5 376 144 22 63 0 70 232 139 0 3	0 14 2 0 236 0 0 65 0	0 413 2 - 0 1,194 0 0 0 4	60 3 0 877 0 0 2,380 4 0 2,780	0 10 0 2 5,801 0 0 4 1,471 0 0	0 772 30 2 521,944 4,902 20 10 16,841 2,014	0 0 0 0	7: 2,08: 25: 26: 606,89' 4,90: 14: 45: 21,42: 2,01: 144: 7,00:

[|] Includes distribution in the Territories and by Government agencies. Does not include materials for manufacture of commercial mixtures.
| Lime-potash mixtures. Cement flue dust shown under "Fotash".
| Included with "Other".
| Amochia, anhydrous and aqua, ammonium sulfate-nitrate; nitrogen solution, urea, and similar materials not segregated. Grand total averages 62% nitrogen.
| Excludes above totals for ammonia, anhydrous, and aqua.
| Excludes materials distributed by other than manufacturers of commercial fertilizers.

In last section "ammonium sulfate" should read "aluminum sulfate".



Kick the tires and hope for the best

The first car you bought. The world may have been yours as you rolled triumphantly on your way. Or perhaps your face was beet red as your best girl helped you push your investment the last part of the way home.

At your desk today, you place most orders by specification. You find quality control and performance tests useful safeguards. Still, conditions being what they are, too frequently you have to hope for the best.

What is your best protection? Probably you agree with other business men who were asked recently. These executives, who account for more than 85 per cent of all Multiwall bag purchases, spelled it out*: The reputation of the seller.

Union has been the acknowledged leader in paper packaging for 76 years. Multiwall buyers who specify Union know

their bags are being supplied by the company best qualified to help them develop a better package.

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It is the kind of treatment you can depend upon.

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TABLE 7 Consumption of Plant Nutrients, By States and Regions, Year Ended June 30, 19511/

	In Mixtures					In All Fertilizers				
State & Region	Phosphoric Oxide				Total		Phosphori			Total
	Nitrogen	Available	Total	Potash	N. Avail. P205, & K20	Nitrogen	Available2	Total3/	Potash	N, Avail. P205, & K20
Waine	8,951	16,725	17,395	19,200	44,876	9,632	18,369	19,059	19,339	47,340
New Hampshire	597	2 259	2,327	2,212	5,068	813	3,959	4,115	2,314	7,086
Vermont	1,119	4,559	4,712	4,560	10,238	1,363	10,488	10,951	4,836	16,687
Massachusetts Rhode Island	3,545	7,669 1,449	7,994 1,534	7,896 1,356	19,110	4,599 879	10,113	10,623	8,395 1,396	23,107 4,093
Connecticut	3,079	4,808	5,112	4,861	3,514 12,748	4,633	7,221	7,692	6,846	18,700
New England	18,000	37,469	39,074	40,085	95,554	21,919	51,958	64,351	43,126	117,003
New York	22,155	50,975	53,177	36,477	109,607	26,241	83,446	87,319	36,956	146,643
New Jersey Pennsylvania	11,025	24,869 64,367	26,107 66,818	22,462 43,951	58,356 128,076	13,017 21,887	27,134 82,478	28,524 86,308	23,195	63,346
Delaware	2,432	6,939	7,240	6,101	15,472	2,680	7,274	7,623	6,159	16,113
District of Columbia	81	145	148	89	315	118	192	196	97	407
Maryland	8,738	28,162	29,935	19,962	56,862	9,677	33,153	35,378	20,297	63,127
West Virginia	1,892	8,334	9,043	5,533	15,759	2,406	15,917	17,003	5,582	23,905
Middle Atlantic	66,080	183,791	192,468	134,575	384,446	76,026	249,594	262,351	136,691	462,311
Virginia North Carolina	19,988 53,574	75,533	80,509 163,550	58,436 120,291	153,957 325,922	30,821 101,270	91,151 163,155	96,559	59,610 127,366	181,582 391,791
South Carolina	25,482	67,497	72,474	48,581	141,560	60,591	81,693	87,405	58,964	201,248
Georgia	40,818	90,622	98,551	73,779	205,219	66,990	109,071	117,963	81,938	257,999
Florida	45,175	64,735	78,467	72,078	181,988	53,543	68,795	84,809	77,852	200,190
South Atlantic	185,037	450,444	493,551	373,165	1,008,646	313,215	513,865	562,007	405,730	1,232,810
Ohio	26,253	112,348	120,273	98,178	236,779	31,128	119,354	130,091	98,768	249,250
Indiana Illinois	24,092	104,420 53,964	111,630 57,878	104,151 58,258	232,663 126,441	37,126 27,289	111,607	131,877	106,060	254,793 188,579
Michigan	12,102	62,491	66,477	52,612	127,205	15,685	68,812	74,018	53,123	137,620
Wisconsin	8,958	51,198	54,417	56,449	116,605	12,047	53,042	62,530	58,661	123,750
East North Central	85,624	384,421	410,675	369,646	839,693	123,275	436,862	660,200	393,855	953,992
Minnesota	5,107	29,030	30,326	21,526	55,663	7,312	41,371	44,319	21,670	70,353
Iowa	10,686	39,532	41,586	18,724	68,942	20,302	59,723	70,836	20,019	100,044
Missouri North Dakota	15,993	54,995 2,989	59,450 3,067	1,020	105,895	29,536	68,821 4,383	114,312	1,038	136,462
South Dakota	289	772	877	68	1,129	621	1,713	1,901	82	2,416
Nebraska	1,655	3,879	4,018	231	5,765	11,824	8,299	8,749	324	20,447
Kanses	4,418	13,392	14,175	2,294	20,104	14,798	39,171	45,952	2,372	56,341
West North Central	38,549	144,589	153,499	78,770	261,908	84,966	223,481	290,613	83,610	392,057
Kentucky Tennessee	14,665	45,514	49,918	32,660 32,359	92,839 86,060	23,629	66,707	79,160	34,784 37,541	125,120
Alebama	34,038	39,101 83,156	42,544 89,709	60,445	177,639	69,127	121,703	132,698	66,958	257,788
Mississippi	18,243	31,762	34,215	22,102	72,107	96,368	55,530	61,302	35,149	187,047
East South Central	81,546	199,533	216,386	147,566	428,645	217,246	304,549	338,799	174,432	696,227
Arkansas	10,776	21,587	23,182	23,596	55,959	40,611	32,832	35,093	33,961	107,404
Louisiana	9,671	18,661	19,961	12,618	40,950	38,319	28,226	32,468	16,649	83,194
Oklahoma Taxas	3,169	8,011	8,512 34,797	3,472	14,652	5,267 38,251	18,808 88,917	27,850 103,374	4,260 17,353	28,335
West South Central	37,667	81,106	86,452	55,877	174,550	122,448	168,783	198,785	72,223	363,454
Montana	216	479	530	23	718	2,018	5,328	5,732	26	7,372
Idaho	728	1,130	1,220	216	2,074	3,347	9,186	9,690	252	12,785
Wyoming	81	149	157	1,035	268 6,718	190 6,760	2,040	2,118	1,159	2,268
Colorado New Mexico	1,830	3,853	3,996	1,035	405	2,357	11,050 5,188	11,329	1,159	18,969
Arizona	3,015	3,922	4,126	389	7,326	22.349	11.174	11,499	631	34.154
Utah	212	425	445	70	707	4,027	3,472	3,665	189	7,688
Nevada	19	35	37	3 020	63	20	250	275	9	279
Mountain	6,257	10,203	10,731	1,819	18,279	41,068	47,688	49,610	2,408	91,164
Washington Oregon	1,995	3,829 3,656	3,981 3,819	3,004 2,128	8,828 7,726	11,907	9,417	9,892	3,970	25,294
California	22,545	22,625	24,043	11,780	56,950	142,063	66,270	69,202	18,170	226,503
Pacific	26,482	30,110	31,843	16,912	73,504	171,255	89,227	93,259	25,247	285,729
Continental U. S.	545,142	1,521,666	1,634,679	1,218,417	3,285,225	1,171,418	2,086,007	2,509,975	1,337,322	4,594,747
Hawaii	5,974	4,547	4,910	8,846	19,367	19,747	7,603	8,483	14,354	41,704
Puerto Rico	32,790	16,050	18,234	27,634	76,474	47,009	16,404	18,589	28,073	91,486
Aleske	10	19	19	11	40	60	113	115	45	218
Territories	38,774	20,616	23,163	36,491	95,881	66,816	24,120	27,187	42,472	133,408
Total: 1950-51	583,916	1,542,282	1,657,842	1,254,908	3,381,106	1,238,234	2,110,127	2,537,162	1,379,794	4,728,155
1949-504	495,360	1,344,295	1,446,118	1,018,174	2,857,829	1,005,452	1,949,768	2,290,081	1,103,062	4,058,282
1948-49	512,474	1,384,669	1,500,030	999,035	2,896,178	919,946	1,941,709	2,289,631	1,073,073	3,934,728

^{1/} Includes Government distribution.
2/ Includes 2 percent of the colloidal phosphate and 3 percent of the phosphate rock marketed for direct application.
3/ Includes total phosphoric oxide in colloidal phosphate and phosphate rock marketed for direct application.
4/ Revised.



THREE ELEPHANT AGRICULTURAL PENTAHYDRATE BORAX

COMPOSITION Contains a minimum of 44% B_2O_3 or approximately 121% equivalent Borax. ADVANTAGE More economical because the Borate in this form is more concentrated.

PURPOSE To correct deficiency of Boron in the soil.

RECOMMENDED USES As an addition to mixed fertilizer, or for direct application to the soil.

FOR CORRECT APPLICATION Consult your local County Agent or State Experimental Station.



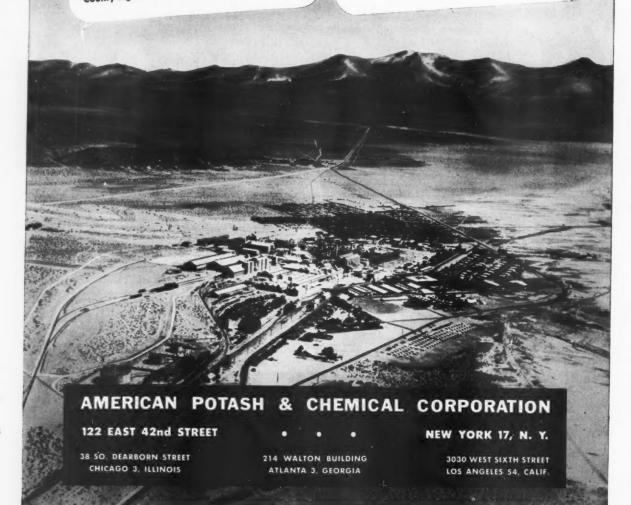
TRONA MURIATE OF POTASH

IMPORTANCE Muriate of Potash is a vitally important ingredient which provides the soil nutriment so essential in the formulation of good mixed

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PURPOSE To help resist plant diseases and enhance the productivity of crops.

TO ASSURE EFFECTIVE RESULTS Specify "Trona" Muriate of Potash . . . made by the pioneer producers of Muriate in America.









Left: Allan B. Kline, president of the American Farm Bureau Federation, addresses the N.F.A. convention. At right is speaker Dr. Milton S. Eisenhower. James E. Totman, Summers Fertilizer company and retiring chairman of the board of directors, chats with his wife, left, Ray King, Georgia Fertilizer company and Mrs. Louis Ware, International Minerals and Chemical corporation, in ballroom of the Greenbrier Hotel, scene of three-day convention.

At the Greenbrier . . .

NFA Members Urged To 'Get Into Politics'

By Hamilton C. Carson
Associate Editor

"Get into politics!"

That phrase summarizes well the tenor of speeches made before the 27th annual convention of the National Fertilizer Association in its three-day meeting at the Greenbrier Hotel, White Sulphur Springs, West Virginia.

Leading figures in government, agriculture and education stressed various phases of problems facing fertilizer manufacturers as the industry passes the one hundred year mark in a period of extreme complexity, but each urged members of the association to exert themselves in electing representatives and shaping governmental policies which effect agriculture and the industries relating to it.

'Get Into Politics'

"You must get active in politics," Sen. Karl E. Mundt (R-S.D.) urged N.F.A. members in his talk on June 17, the second day of the convention.

"We must make sure we give the American system of government one good chance to prove itself in a period of adversity before scrapping it for foreign ideologies," he added. Similar sentiments were voiced by Allan B. Kline, president of the American Farm Bureau Federation and Dr. Milton S. Eisenhower, president of Pennsylvania State College, in their addresses.

"The answer is primarily political," Kline said in forwarding a solution to the problem of defending the American way of life. "If politics is dirty," he declared, "that's your fault.

"If you members of N.F.A. are interested in selfgovernment, you must be interested in politics so that

able persons are chosen to represent you in that form of government," he concluded.

Dr. Eisenhower attacked the problem from a different vantage point.

In outlining methods by which American citizens can insure a "Framework for Peace," he stressed the responsibility of each individual in studying governmental ac-

tions and making sure they are in the interests of long-range peace.

'Fateful Responsibility'

"The citizens of the world—including every one of us here today—have never faced a more fateful responsibility for active, intelligent citizenship. I firmly believe that we can help greatly to tip the scales toward lasting peace, if we fulfill our responsibility







Mrs. Ray Pavlak, Wisconsin Cooperative Farm Plant Foods, talks with Warren Huff, Ashcraft-Wilkinson co. at Greenbrier. At right, J. W. Turrentine, American Potash Institute, discusses the fertilizer situation with Mrs. Horace M. Albright, United States Potash company, and Mr. and Mrs. W. A. Minor, of the United States Department of Agriculture.



Above: Mr. and Mrs. Maurice Lockwood, International Minerals and Chemical company. Below: George H. Kingsbury, Kingsbury & co., C. R. Martin, Miami Fertilizer company and C. T. Prindeville, Swift & co., relax in lounge at the famous hotel.



with the utmost in devotion and understanding," the college president stated.

The three speakers highlighted what was termed by several N.F.A. delegates as the finest group of speakers ever to address an association convention.

Other pertinent suggestions were given to the delegates by John H. Stambaugh, assistant to the Secretary of Agriculture, who spoke on the subject "Agriculture—An American Business Opportunity."

"You are producing a product that literally sells itself," Stambaugh said. "It all adds up to one thing—a business opportunity for fertilizer manufacturers that is almost unparalleled in the history of American industry."

Stimulating convention addresses, summarizing last year's activities of N.F.A. and the outlook for the future were given by James E. Totman, chairman of the board of directors and Russell Coleman, president of the organization.

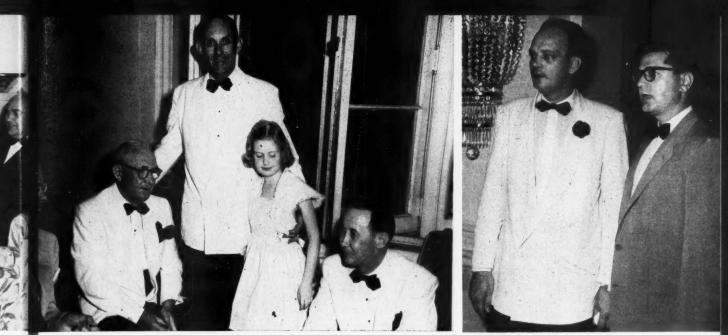
Totman Gives Forecast

Totman discussed the situation in regard to nitrogen, phosphorus and potash and concluded that "the present 1,000 fertilizer factories with their more than 50,000 agents and dealers will continue to furnish a well-established efficient distribution system that will serve our farmers well, and continue to furnish them the grades they need to grow their crops."

Dr. Coleman outlined educational activities of N.F.A. in stimulating new and better uses for fertilizer and summarized other activities of the organization which, he said, "have paid handsome dividends to our entire industry—dividends which are measurable in terms of dollars and cents—but which have accrued to the value of agriculture as well as to our industry."

The president added that N.F.A., "like many other corporations, sees a need and an opportunity for expanding its facilities. We believe that our growing industry requires a growing trade association. Therefore, as our income increases we plan to make further investments that will pay continual dividends to you."

But it was by no means "all speeches and no enter-



Walter Crady, second from left, North American Phosphate company visits with Ohio Valley Fertilizer corporation representatives. From left, Herbert Moore, Crady, Gil and Molly Sue Nooe and Douglas McLoney. At right, George V. Taylor, Spencer Chemical company, gets together with Charles A. Cogliandro, Calabrian company.

tainment" for delegates who journeyed from all parts of the country to attend the convention.

Ladies' Garden Party

A garden party for the ladies highlighted activities Monday, along with golf, tennis, shuffleboard, horseshoe and other games for the men.

Social highlight of the convention was the Festival Night program Tuesday evening. A refreshment hour sponsored by International Minerals and Chemicals corporation got the evening off to a gay start and the annual convention banquet (with no speakers and plenty of steak) followed. The "Skyliners," a male quartet, entertained with songs for an hour in the assembly room and a Meyer Davis orchestra provided music for a colorful dance in the Ball Room.

Senator Mundt's address was the most enthusiastically received by the 763 persons who broke the attendance record for N.F.A. conventions.

'Greatest American Export'

"The greatest American export we can make is the Idea of Freedom," he declared. "And the most dangerous imports are foreign ideologies," he added.

"There are many persons in this country who want government control of fertilizer production," he said, "even though history has shown that it can be produced more rapidly, more economically and more efficiently by private ownership."

In asking for a test of the American system in a period of adversity, Senator Mundt said that one of the alternatives to that system—complete governmental control—has failed in Russia in a period of trial.

"We must get active in politics to give our system a chance and protect it from groups which would destroy freedom while paying lip-service to it," he said.

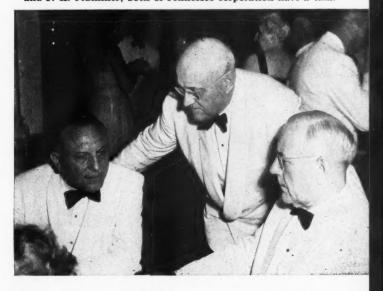
Kline said he thought citizens should find out "what our idea of freedom means so we can unite with other countries in defense of it."

He enumerated two objectives which he said could unite democracies in defense against enslavery by dictatorship.

These, he said, are 1. To maintain and enhance
(Continued on page 54)



W. W. Baker Jr., and J. W. Reisack, both of H. J. Baker & Bro., meet with J. G. Reynolds, Bethlehem Steel in upper photo. Lower: J. O'H. Sanders, Fulton Bag & Cotton Mills, W. D. Barton and J. K. Plummer, both of Tennessee corporation have a talk.



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APFC Hears Plea For Bigger Production

By Hamilton C. Carson

Associate Editor

ORE, more, more." Those words were reiterated by speakers at the seventh annual meeting of the American Plant Food Council at The Homestead, Hot Springs, Va., June 19–22.

The "more," of course, referred to chemical fertilizers. All the speakers, who included leaders in government, education, research and agriculture, agreed that more and better fertilizers would have to be produced by the industry if the national welfare is to be preserved.

In a secondary theme at the convention meetings, held high up in the picturesque Blue Ridge Mountains, a few of the speakers, including Senator Harry F. Byrd (D-Va.), principal speaker at the annual banquet, decried government interference in agriculture and excessive governmental spending.

A record number of members and their wives attended the convention, with registration at well over 500.

While the convention assemblies provided sobering thoughts for the delegates on the future of agriculture and the responsibilities of the fertilizer industry, there was plenty of recreation.

Golf, tennis, card games, dancing and special en-

tertainment highlighted the recreational side of the four-day get-together, with perfect weather providing a colorful setting for the activities.

Increased Production Needed

Although the convention speakers considered various sides of the basic problems of the industry, most agreed that the biggest single need in the industry at this time was increased production to offset a possible drop in the standard of living caused by a continually expanding population depending on a limited amount of cropland.

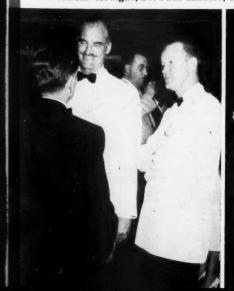
The support of fertilizer manufacturers in furnishing farmers with essential plant foods with which to feed a rapidly increasing population was pledged by Paul T. Truitt, president of the American Plant Food Council, who said "the growth of the population and the comparatively arable acreage guarantee the need for an increasing total agricultural output."

Truitt cited record production of the fertilizer industry in recent years.

Industry Breaks Records

"Each year since 1938," he declared, "the fertilizer industry has reached a new high in delivering fertilizer to the farmer. This means that, since 1938,

Future of the fertilizer industry may be the topic as Dr. R. H. Bamberg, bureau of the budget, Thomas W. Childs, Southwest Potash corporation and John Sanford, Armour Fertilizer Works meet in photo at left. Center: J. J. Devlin, and Thomas W. Camp, Southwest Potash corporation, talk with C. C. Arledge, Virginia-Carolina Chemical corporation. At right, Dr. Paul Sanders, editor of Southern Planter, introducing O. V. Wells, USDA at convention forum.







RECOGNIZING THE GROWING
DEMAND FOR AMMONIUM
SULPHATE IN THE MIDWEST,
AND TO BETTER SERVE THE
NEEDS OF FERTILIZER
MANUFACTURERS IN ITS
NORMAL MARKETING AREA
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when we produced $7\frac{1}{2}$ million tons, the demand now has increased to 21 million tons plus."

Consumption of chemical fertilizer for the crop year ending June 30, 1951, represents a 14 per cent increase over the previous crop year, the council president stated.

Interesting figures on the value of fertilizers and pesticides to crop production were cited by Dr. Herrell F. DeGraff, professor of food economics, school of nutrition, Cornell University.

Dr. DeGraff said a conservative estimate is that "one-quarter of our total crop production is directly attributable to chemical fertilizers. If the contribution of pesticides is added, the products of the chemical industry must account for a full third of our annual crop output."

The speaker said this still is not the whole story "because the same chemicals also are a most effective form of crop insurance for the other two-thirds of the yield."

Fertilizers High on List

He placed fertilizers high on the list of production supplies needed by farmers and stressed the fact that "if soil and crop science push on, the nation will not particularly need additional acreage to grow the necessary food for an expanding population."

Dr. Paul D. Sanders, editor of the "Southern Planter," also called for "an abundance of fertilizers" and said they are one of the tools which farmers must have if our nation is to continue to be the best fed, the best clothed and the best housed in the world.

Dr. Sanders spoke as moderator of an agricultural forum on "Major Factors Influencing the Future of Agriculture."

The sentiments of Dr. Sanders were echoed by other speakers on the forum. Dr. Byron T. Shaw, administrator of the Agricultural Research Administration, USDA, told the Council "our first job is to maintain our present dietary level and to do that we must find a way to provide as much additional food and fiber as could normally be expected from 70 million acres of cropland and pastures."

Better Use of Land

Continued gains in the future should come from research and technology, he said, adding that if the nation continues to consume food and fiber at the current rate, "we will need the equivalent of an additional 115 million acres of cropland, assuming yields per acre continue at about 1950 levels."

Dr. Shaw said he believed the greatest opportunity the country has for making up a predicted shortage

Top: Leading figures at the Convention banquet table include, from left, Sen. Harry F. Byrd (D-Va.), Mrs. George E. Petitt, wife of past chairman of executive committee, President Paul T. Truitt and Mrs. Harold D. Cooley, wife of House agriculture committee head.

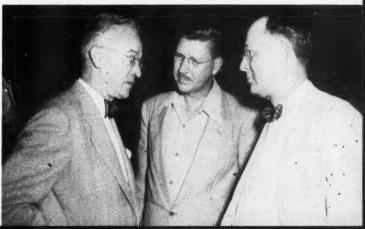
Second: Dr. K. D. Jacob, USDA, talks with William T. Doyle of the Sturtevant Mill Company between sessions. Third: Getting together in Homestead's spacious lobby are Roy Gurkin, Fulton Bag & Cotton Mills, Mr. and Mrs. Herbert Rogers, H. Rogers co., J. O'H. Sanders, Fulton Bag and A. F. Pringle Jr., A. F. Pringle co.

Bottom: Exchanging views at the convention are R. S. Hill, Reliance Fertilizer & Lime corp., Frank Wilson, Stagson corp. and R. B. Douglass, Smith-Douglass.









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of 70 million acres in 1975 is in better use of the land already available.

"This assumes greater efficiency in production on farms and improved distribution, utilization and marketing after the products leave the farm. We already have made great strides in this direction," he said, "but we are not making them fast enough."

In discussing another phase of the problem, D. Howard Doane, chairman of the board of Doane Agricultural Service, said the most significant contribution to American agriculture that has occurred within the last fifty years is "the new concept of making very heavy initial applications of fertilizers in order to lift the level of farm production, instead of applying only crop needs."

"We will feed our future expanded population," he asserted, "if a decreasing agricultural population with a smaller voice in national affairs still can hold an equitable position in our economy."

On the other general theme stressed by the speakers, that of government interference, Herschel D. Newsom, Master of the National Grange, warned that "we must all be vigilant and realize that while big government cannot swallow all of us at one time, we can be devoured individually."

He emphasized that the basis of our legislative program "is acceptance of responsibility by the individual. This is in sharp contrast to the concepts of some groups and organizations who hold that big government is the answer to our problems. The Grange feels that the individual, including the farmer, has the responsibility for assuming a larger share of the problems we face today."

"Dangers of State Socialism"

Dangers of "state socialism" were sounded by Senator Byrd in his banquet address. The Virginia Democrat attacked a "governmental course, which in recent years has been proceeding steadily toward state socialism which, unless quickly checked, will destroy the American system."

Hitting at the spending policies of the Truman administration, the speaker said "the federal government is spending your money at the rate of \$2,000 every time the clock ticks and it is collecting taxes from you at the rate of nearly \$1,600 every second of every day and every night."

Senator Byrd said the government is adding \$400 a second to the public debt by deficit financing.

He concluded by declaring "there are many doors to the house of socialism. It is very easy to get in but very hard to get out."

Other governmental speakers stressed the need for (Continued on page 54)

Top: Time out for discussion is taken by Edwin Sterne Jr., Chilean Nitrate Sales corp., A. H. Sterne and E. N. Shelton, Tennessee corp., and Philip H. Groggins, National Production Authority.

Second: Agronomy is the subject as Dr. John R. Taylor Jr., Plant Food Council, talks with Borden S. Chronister, Nitrogen division, Allied Chem. & Dye.

Third: Leroy Donald, left, Lion Oil company, confers with F. S. Moore, F. S. Royster Guano company.

Bottom: Top personnel of Commercial Solvents corp., Clyde T. Marshall and J. A. Woods, talk with C. C. Arledge, Virginia-Carolina Chemical corp. at Homestead.









July, 1952

Resistance problem plays big part in recommendations for

Insecticide, Rodenticide Use in '52



Enjoying a good meal while he still can, this rat won't live very long—he's eating Warfarin.

DEVELOPMENT of resistance in many insects to recent pest control chemicals has caused much concern in the pesticide industry.

Several years ago the problem was brought into focus when DDT became less and less effective for fly control in several areas. The problem was emphasized recently when military leaders in Korea discovered effectiveness of DDT against lice was dropping.

Important research work on the subject was reported recently by the Connecticut Agricultural Experiment Station, where two scientists, Dr. Raimon L. Beard and Neely Turner used pesticides with short term toxicity and a combination of chemicals to combat insect resistance.

Still, the problem persists. It plays an important part in recommendations for use of insecticides and rodenticides for 1952 made recently by the Communicable Disease Center, Public Health Service, Sayannah, Ga.

In a paper prepared by the Technical Development Branch of the Center, the matter of persistance is a major factor in influencing recommendations for control of pests. The paper was printed in the May issue of Public Health Reports.

The Branch has been conducting laboratory and field investigations to determine effectiveness and toxic hacards of various economic poisons which offer promise for use in communicable disease control.

Results of these investigations and a review of work done by other research agencies have been used as a basis for recommendations on materials, dosages and application techniques for use in field operations.

The Center points up the difficulty involved in dealing with insect resistance in the following statement:

"The rapidly changing status of resistance to insecticides exhibited by some insect species makes it difficult, if not impossible, to make general recommendations for their use in all areas. Consequently, it will be necessary for operators in any given area to adapt these recommendations to the situation at hand."

Mosquito Control

First instance of resistance is discussed in the field of mosquito control. Salt-marsh mosquitoes have developed resistance to DDT and other insecticides in several areas, according to the report. In addition, during the past year, there have been indications from several scattered areas that some species of the *Anopheles* are developing resistance to DDT.

Workers at the Tennessee Valley Authority have reported *Anopheles* quadrimaculatus may be developing resistance to DDT in some localities where the pesticide has been in continuous use for five years.

In general, the paper states, the species does not appear to have developed resistance to DDT to a degree which would affect control measures significantly.

For control of A. quadrimaculatus a continuation of adopted procedures is recommended. This is the use of 5 per cent DDT emulsion residual sprays in homes to control adult mosquitoes and the use of 0.05 pound of DDT in one gallon of fuel oil per acre to control larvae.

For airplane treatment, DDT at the rate of 0.05 to 0.10 pound per acre, applied as a 20 per cent solution in methylated naphthalenes, such as Velsicol NR70 or Sovacide 544B, is suggested. For outdoor space spraying, to control adult mosquitoes, a 5 per cent DDT emulsion or a 5 per cent oil solution is recommended.

Varying degrees of resistance to several chlorinated hydrocarbons, including DDT, Toxaphene, Lindane, Aldrin and Heptachlor by *Culex tarsalis* in some California localities have been reported by the Bureau of Entomology and Plant Quarantine. DDT-DMC combinations are suggested on a field trial basis for control.

Resistance to DDT brings up the subject of substitutes for the chemi-

cal. As an initial substitute against DDT-resistant strains of mosquitoes, the BEPQ found Lindane at 0.1 pound per acre or technical BHC at 0.4 pound per acre to be effective larvicides when applied as fuel oil solutions from the air.

BHC Recommended

For control of the insect in small, land-locked, fresh-water ponds, the Communicable Disease Center states that technical BHC emulsions at the rate of one pound per acre have given satisfactory control for periods ranging from five to eight weeks.

Dieldrin applied as an emulsion concentrate or a wettable powder suspension at the rate of one pound per acre also will prevent mosquito breeding for more than a year. The Center points out that the chemical is completely destructive to other

forms of aquatic life and should not be used except in emergency or in other unusual circumstances.

The problem of insect resistance also is paramount in control of houseflies. According to the report houseflies have become highly resistant to DDT and in some instances to several other chlorinated hydrocarbons in areas of extensive use of residual sprays.

Residual Insecticides

Research work during the past year with residual insecticides unfortunately has yielded very few promising leads for the solution of this problem. The center still recommends DDT in areas where houseflies remain susceptible to it, except in dairy barns and other places where it may contaminate milk.

Other insecticides recommended include Dieldrin, Chlordane, Lindane, methoxychlor and Dilan. Dieldrin is advised for application as a 0.625 per cent emulsion as an outdoor spray for use by trained personnel in organized fly control programs in areas where DDT-resistant flies still may be susceptible to this compound.

Chlordane should be applied for selective spot treatment inside dwellings and on porches, insides of out-buildings and other locations relatively protected from the weather. Lindane applied at the rate of 25 mg. per square foot or

methoxychlor at 200 mg. per square foot are recommended for places where the use of other chlorinated hydrocarbons might contaminate milk. Dilan is suggested as a residual spray for experimental testing on operational fly control programs.

For larvicidal fly control in certain situations, the center suggests Chlordane, Lindane, BHC, Dieldrin and Aldrin, but cautions that their use may result in development of the same resistance encountered when they are used as adulticides. These materials should be applied at the same dosages per square foot as recommended for residual sprays.

Use of space sprays is the only alternative for control of flies when they have developed resistance to the chemicals as residual sprays and larvicides.

For this technique, the center suggests selective treatment of night-time resting places. Chemicals recommended include combinations of DDT with DMC at ratios ranging up to 20 to 1, 2.5 per cent emulsions of Dilan applied outdoors at dosages of 0.05 pound per acre, pyrethrum formulations, which are among the most reliable and least toxic to humans of the space sprays, a 5 per cent technical BHC or a 2 per cent Lindane emulsion and Chlordane as a 2.5 per cent emulsion.

Importance of sanitation, especially in light of insect resistance to insecticides, is emphasized by the center for adequate control of the pests

DDT and Chlordane are the chemicals recommended for control of fleas. Suggested application for DDT is a 5 per cent dust for rat runs and harborage areas for control of oriental rat flea. A 10 per cent formulation still is preferred for most applications, the report adds.

For controlling soil infestations of cat and dog fleas a 10 per cent Chlordane dust should do the job. Chlordane also is recommended in a 2–2.5 per cent emulsion or oil solution for spot spraying for roach control, except in homes.

Although the problem of pest resistance is a big one in the case of mosquitoes and flies, it apparently has not entered the field of rodent control, according to the report of the Center.

Possibilities of rodent control appear to be more encouraging than ever, according to the organization. Warfarin, most recent addition to the rodenticides maintains its early promise.

The chemical is the first effective slow-acting rodenticide and has characteristics which make it the first effective residual rodenticide ever developed.

Warfarin Use

Warfarin susceptibility differs with various species of rodents, so it is advisable to use the lowest bait concentration consistent with the most effective control.

A concentration of 0.250 mg. of the chemical per gram of bait is recommended for control of the roof rat, *Rattus rattus*, while 0.050 mg. per gram is effective for control of the Norway rat. For mice, the same application as for Norway rats is suggested. Warfarin may be used for initial rodent control under essentially all conditions, using a minimum baiting period of two weeks. In addition, bait stations should be established for permanent control in places subject to reinfestation.

The Public Health Service recommends two other products for rodent control.

ANTU, according to the center, still holds a definite place as a quick-acting poison for the Norway rat. Its use to reduce large populations rapidly may be followed by the use of warfarin for complete and permanent control. Sodium monofluoracetate still is the most effective, fast-acting rodenticide, but its extreme toxicity to man and animals requires that it be used only on certain types of premises and only by carefully trained crews.

For bait, the center found corn meal to be the most readily accepted cheap material in the Savannah area but, in general, recommends any available cereal bait for use in rodent control.

The importance of sanitation, including proper garbage disposal, food storage, harborage elimination, and rat proofing is emphasized, the report stresses. Sanitation is essential to permanent control of rats and mice associating with man, and the use of rodenticides should be regarded as supplementary to sanitation.

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FERTILIZER MATERIALS MARKET

New York

June 10, 1952

Sulfate of Ammonia

At the present time, demand for this material is very heavy and with the production cut down by the steel strike a tight situation is looked for during the next few weeks. One synthetic producer has notified his customers of a price advance of \$2.00 per ton, f.o.b. a Texas production point, effective July 1st.

Nitrate of Soda

With several large cargoes arriving recently from Chile, the supply situation is slightly better but the effects of the recent strike will be felt for some time to come. The material that arrived was quickly disposed of against recent allocations.

Ammonium Nitrate

Producers are having a hard time keeping up with the steady demand and are shipping against current contracts.

Nitrogenous Tankage

There probably will not be enough of this material to go around the coming season unless the production improves materially. No change in prices is heard.

Castor Pomace

Further sales were made of this material at \$37.25 per ton, f.o.b. production points for material guaranteed 6.75 per cent ammonia in bags and demand is steady even though the current fertilizer season is about over.

Organics

Organic fertilizer materials maintained a fair tone and some buyers were looking ahead for their requirements for the coming year. Soybean meal was around \$88.00 per ton, f.o.b. Decatur, Ill., in bulk but linseed meal was still hard

to locate and cottonseed meal was firm at ceiling prices when available. Tankage sold at 86.50 per unit of ammonia (87.90 per unit N), f.o.b. Eastern shipping points, and blood at the same price.

Fish Meal

Early season reports on the fishing for menhaden have been rather disappointing and some additional sales have been reported at around ceiling prices on a "when and if made basis." Imported fish meal continues to arrive from Africa and various Scandinavian countries.

Bone Meal

A better demand is noted from the fertilizer grade for this material and the supply situation at the present time is not enough to take care of the demand during the next few months. Demand from the feed trade is poor at present.

Hoof Meal

Little trading was reported in this material with last sales made on the basis of \$6.50 per unit of ammonia (\$7.90 per unit N), f.o.b. Chicago.

Superphosphate

With recent price increases granted several producers due to increased costs, a better supply picture is indicated and with the peak of the shipping season passed this material should tend to ease up slightly as far as demand is concerned. Triple superphosphate is still in heavy demand.

Potash

One major producer has been granted a small price increase and other producers are awaiting action by the O.P.S. on their applications for increased prices. The advance amounts to 2 cents per unit but in the meantime all producers have sent out price lists to the trade and are allocating their tonnage for the coming season.

Philadelphia

June 10, 1952

The raw materials market remains quiet with contract shipments moving with fair regularity—except sulfate of ammonia. Chilean nitrate is again arriving. Blood and tankage are higher while bone meal about holds its own. Fish meal is very quiet. Normal superphosphate is stronger and potash demand continues fairly active.

Sulfate of Ammonia.—This continues in short supply and the present steel strike offers no encouragement. A few cars of resale material which appeared on the market were quickly absorbed.

Nitrate of Ammonia.—This is still well behind the demand although production seems to be ahead of last year.

Nitrate of Soda.—This is now arriving from Chile after settlement of the strike there, and is being rapidly absorbed. The demand is good.

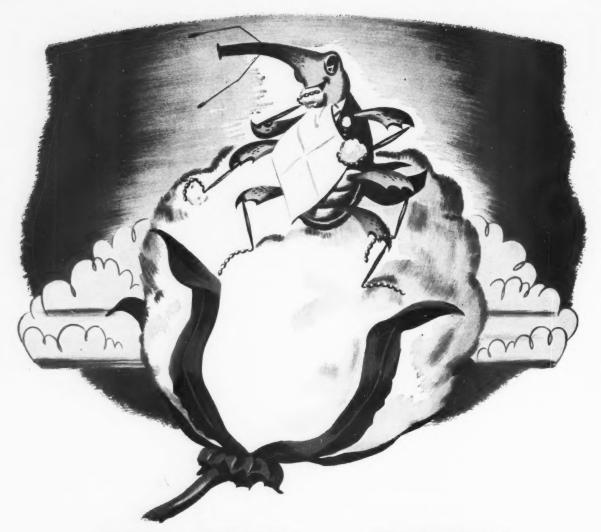
Blood, Tankage, Bone.—Blood and tankage are stronger at \$6.50 to \$6.75 per unit of ammonia (\$7.90 to \$8.20 per unit N), with slightly increased demand. The call for bone meal is not too active and prices range from \$70.00 to \$75.00 per ton, depending on the grade. There is no call for hoof meal.

Castor Pomace.—Production is moving mostly against contracts, with the nominal market \$37.25 per ton at the producing plants.

Fish Scrap.—Fishing operations have been interfered with by unfavorable weather. However, the market is quiet. Importations have been far beyond those of last year.

Phosphate Rock.—Shipments continue to move against contracts, and there have been no recent developments. Supply is ample.

Superphosphate.—The price in New York area has now been advanced to 86 cents per unit following the recent increase in other places. The supply position is tight and the demand strong.



BOLL WEEVIL... BEWARE!

Another big blow to the Boll Weevil has been struck by the Tennessee Frontier Corporation with a brand new plant for the production of Benzene Hexachloride* at Wichita, Kansas. The sales of the production of this BHC* plant are handled by Tennessee Products & Chemical Corporation, Frontier Chemical Corporation and the Colorado Fuel & Iron Company.

Manufacturers of dust and spray formulations for use against Boll Weevils in the cottonfields know the effectiveness of BHC for doing the job quickly and surely. They can be sure of quick deliveries for their production requirements of BHC from Wichita.



TENNESSEE FRONTIER

CORPORATION

WICHITA, KANSAS

JOINTLY OWNED BY TENNESSEE PRODUCTS & CHEMICAL CORP., FRONTIER CHEMICAL CORP. AND COLORADO FUEL & IRON COMPANY

Potash.—Recent price quotations are same as last year but with reservations permitting producers to make increases under certain conditions. Muriate is presently priced at 42 cents per unit K₂O, and 20 per cent manure salt at 21 cents, subject to same discounts as last season.

Charleston

June 10, 1952

Superphosphate continues in relatively tight supply position. Hard nitrogen is in definite short supply and potash supplies are adequate. Most fertilizer manufacturers are winding up their season.

Organics.—Activity in fertilizer organics is rather spotty with interest, if any, for new season's use, Nitrogenous tankage is nominally priced at \$4.25 to \$4.90 per unit of ammonia (\$5.16 to \$5.95 per unit N) f.o.b. production points. Offerings of imported nitrogenous tankage are relatively light at prices varying from \$5.90 to \$6.00 per unit of ammonia (\$7.17 to \$7.29 per unit N), in bags, c.i.f. Atlantic ports.

Castor Pomace.—Limited offerings are now in the market for shipment June, July, August at \$37.25 per ton in burlap bags or \$2.00 less if in paper bags, f.o.b. Northeastern production points. Analysis is guaranteed minimum 6.75 per cent ammonia.

Dried Blood.—Unground blood is held at Chicago at around \$7.00 to \$7.25 per unit of ammonia (\$8.51 to \$8.82 per unit N) in bulk. New York market is indicated at around \$6.50 (\$7.90 per unit N).

Potash.—One producer has announced prices of 44½ cents for regular type grade and 46½ cents for granular type 60/62 per cent muriate. The increase of 2½ cents per unit has been approved by the OPS but seller is shipping on the competitive price of 42 cents and 44 cents at present. Other domestic producers expect to increase their prices to 44½ cents for regular type subject to OPS approval. Major importers of potash have not announced price as yet.

Ground Cotton Bur Ash.—One of the foremost producers of this potash, primarily in the form of carbonate of potash, has announced his price for new season and his price has been reduced to the point where bur ash delivers competitively in many cases, cheaper than sulfate of potash. This seller expects to ship material testing 40 per cent K_2O .

Phosphate Rock.—The market continues in a position of relative balance. Prices remain firm.

Superphosphate.—Demand continues steady at ceiling prices and the market is described as relatively tight.

Sulfate of Ammonia.—The current strike at the steel mills has tightened this market drastically. Demand is strong and supply short.

Nitrate of Soda.—This market continues tight in spite of recent arrivals of imported material. Domestic supplies are being taken as produced.

Calcium Ammonium Nitrate.— Small supplies of this imported form of ammonium nitrate testing 20.5 per cent nitrogen have been taken upon arrival at the ports. No more imports are planned the balance of this season.

Hercules to Construct New Biological Lab

Plans now are being drafted by the Hercules Powder company engineering department for a new biological laboratory to be constructed at the company's experiment station near Wilmington, Del.

The new structure will enable the company to expand its work in biological, botanical and agricultural fields.

Construction will begin in September, and it is expected the laboratory will be ready for occupancy by April, 1953. The project consists of a main laboratory building and two greenhouses. The cost of the project is estimated at \$400,000.

Dr. E. N. Woodbury, chief entomologist, will lead the work of the laboratory. Research carried on by the company at independent commercial laboratories and other agricultural experiment stations will be coordinated through the new central unit. A staff of approximately 15 persons will be employed.

Mexico Wants Cheap Fertilizer

Sterile Mexican lands, containing large quantities of saltpeter may become productive sources of large quantities of fertilizer as a result of experiments being undertaken by the Department of Agriculture. This is another phase in the government's search to provide low-cost fertilizers for farmers.

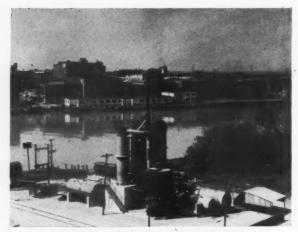
Chemists of the department now are engaged in studies to utilize vast saltpeter lands in the country, and especially the rich deposits in the dried out bed of Lake Texcoco, on the outskirts of Mexico City.

Experiments are being made for the exploitation of the Texcoco deposits, utilizing solar energy for the precipitation of nitrate of sodium, through use of low depth reservoirs which have been constructed for the purpose. Bottoms of the reservoirs have been lined with a layer comprised of a mixture of stone with a fine powder, residue of saltpeter extraction processes.

The government has indicated it will subsidize Mexican firms which are yet to be organized, for the full exploitation of saltpeter beds in the production of sodium nitrate. Officials believe that once production is begun Mexico can produce enough sodium nitrate to assure large surpluses for export.

There has also been a stepping up in the production of the sulfur plant installed by Petroleos Mexicanos in Poza Rica, now operating at a rate of 140 tons daily. This, according to government officials, is sufficient to satisfy Mexican industry. However, Pemex has announced that it will build up production to full plant capacity of 300 tons daily.

Part of the production has been earmarked for the elaboration of fertilizers, fungicides and insecticides. When production is increased, surpluses will be exported. Exports now are strictly limited, authorized by the Department of National Economy, and have principally been for Canada, in keeping with an agreement whereby Mexico is to receive newsprint for its sorely pressed newsprint industry.



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Charleston, S. C.

Industrial News

New Products

New Plants

New Appointments

Soil Conditioner Battle On; Monsanto Describes Krilium

Claims, counter-claims, explanations and new products came thick and fast last month as the soil conditioners started to boom in earnest.

Monsanto Chemical company, which started all the excitement with announcement in December of its product Krilium, was back in the news with an explanation about its formulation.

According to a company spokesman, formulation of Krilium is based on the chemicals which "we have tested for years and which have proved most effective for home gardens of all the chemicals we have examined."

Base of the new product, according to Charles Allen Thomas, president, is a vinyl acetate maleic acid compound, identified as CRD 186. He said much of the data presented at the time of Monsanto's original announcement of soil conditioners in December, 1951, were based on widespread field studies involving this compound.

Asked by FARM CHEMICALS what relationship, if any, Krilium had with several soil conditioners launched after its announcement, a member of Monsanto's public relations staff said "there is no relationship at all between Krilium soil conditioner and any of the products."

Thomas said the company originally had not planned to divulge "our new materials, but conflicting claims in the soil conditioner field make us feel a responsibility to issue a clarifying statement at the present time."

Monsanto also refuted claims its product was manufactured with polyacrylonitrile. In attempting to clear up this confusion, Thomas stated "In Monsanto's announcement of Krilium soil conditioner ... our company and its technical cooperators agreed that it was desirable to identify at least one of the synthetic polyelectrolytes covered in our work up to that time.

"We identified one of these synthetic polyelectrolytes as hydrolyzed polyacrylonitrile because it was a well-known chemical in this group. Because of the diversification and intensity of our three and one-half year testing program, however, we had learned that the polyelectrolyte based on a modified vinyl acetate maleic acid compound was the most effective material of the hundreds tested," he added.

Thomas went on to point out that "current manufacturers of acrylonitrile-type soil conditioners apparently assumed—erroneously—that the data on improved aggregation and other soil benefits announced by Monsanto and its cooperators were based entirely on a hydrolyzed polyacrylonitrile."

Monsanto also announced formation of a merchandising division to handle consumer sale of Krilium. Roy L. Brandenburger was named to head the new division.

Other products making debuts in the soil conditioner field included:

Aeritil—Marketed by American Cyanamid company. In two forms: as an easily soluble, highly concentrated flake form of 83 percent active ingredients and as a 40 per cent powder. Company said development of the soil conditioner followed 15 years of pioneering by Cyanamid in the field of chemistry made possible by acrylonitrile, a nitrogen chemical it introduced in U. S. in 1940.

Ackril—Manufactured by Bonded Chemicals, this synthetic resin soil conditioner improves soil workability by increasing aeration.

Cyanamid Appointee



Edward K. Bender

New agriculturalist for American Cyanamid company is Edward K. Bender, who will be engaged in cooperative demonstrations and field research in the Middle Atlantic states. He will work with growers, canners, universities and agricultural experiment stations.

Bender was vegetable specialist with the University of Maryland for the past six years.

He was graduated from the University of Maryland and studied also at the University of Hawaii while serving in the Navy in World War II.

Pesticide Supplies Seen Sufficient for Requirements

All anticipated requirements for pesticides this season will be met by supply of the materials, USDA reported recently.

High rate of production in the pesticide industry was credited with the favorable situation in the field. Farmers will have no trouble getting the appropriate type chemical for all control measures, according to the report. Production of synthetic organics has been especially helpful in creating the excellent supply picture.

It's a Good Mixer!



Nitrogen is in great demand. Even Phillips tremendous capacity isn't equal to today's requirements. But we're making four different kinds of high-quality nitrogen material for mixers and farmers.

- 1. AMMONIUM NITRATE . . . Phillips 66 Ammonium Nitrate contains 33% N. Small, coated, uniform pellets flow freely and resist caking.
- 2. NITROGEN SOLUTIONS . . . there are three Phillips 66 Nitrogen Solutions for use in the preparation of high-analysis fertilizers and the ammoniation of super-phosphate. These solutions keep handling costs low . . promote rapid, thorough curing.
- 3. ANHYDROUS AMMONIA... Phillips 66 Agricultural Ammonia contains 82% N. Convenient, economical source of nitrogen for fertilizers.
- 4. AMMONIUM SULFATE (see photograph and description above.)

For full information write our nearest district office.



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Industrial News

Allied Chemical Forms New Nitrogen Division

Manufacturing and related operations of the Nitrogen and Organic sections of Solvay Process division now are being handled by a newly formed Nitrogen division of Allied Chemical & Dye corporation. Sales of products, formerly handled by Barrett and Solvay also will be done by the new division.

Personnel concerned with sales and other activities have been

transferred with sales and other activities have been transferred to the Nitrogen division.

Hugo Riemer, formerly executive vice president of the Solvay Process division, is president of the Nitrogen unit. He is assisted by Dr. M. F. Fogler, formerly vice president of Solvay and F. T. Techter, a former Barrett vice president. Both men are executive vice presidents of the new division.

Dr. C. S. Fazel, who was vice president of Solvay, now is a vice president of the Nitrogen division.

The Solvay Sales division has become a sales department of the Solvay Process division.

The Nitrogen division will operate and market the output of the Nitrogen plants at Hopewell, Va., and South Point, O., the new \$25,000,000 nitrogen plant to be constructed near Omaha, Neb., and the new organic chemicals plant to be built at Orange, Tex., for the manufacture of ethylene oxide and ethylene glycol.

ANNOUNCING

ALLIED CHEMICAL & DYE CORPORATION

NITROGEN DIVISION, Allied Chemical & Dye Corporation, was formed June 1, 1952, by combining the Sales Agency Department of The Barrett Division and the Nitrogen and Organic Chemicals Sections of The Solvay Process Division, Allied Chemical & Dye Corporation.

The Sales Agency Department of The Barrett Division formerly sold the nitrogen products manufactured by The Solvay Process Division. The formation of the Nitrogen Division consolidates production and sales into one organization, thus streamlining these two operations for greater efficiency.

Nitrogen Division now operates and markets the output of the Nitrogen plants at Hopewell, Virginia, and South Point, Ohio. Some of the products now handled by the Nitrogen Division are listed below.

Other new plants and new products will be announced at an early date.

Anhydrous Ammonia • Nitrogen Solutions • URANA† Solution

ARCADIAN*, the American Nitrate of Soda • A-N-L* Nitrogen Fertilizer

Sulphate of Ammonia • NYTRON* (Synthetic Organic Detergent)

Production and sales will be handled by essentially the same personnel that has functioned heretofore...your assurance of high standards of product quality and reliable, dependable service.

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†Reg. Applied For,

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ATLANTA UTILITY WORKS

EAST POINT, GA.

Industrial News

7-1 'Tellevel' Indicator



Heavy-duty and explosion-proof units have been added to the Stephens-Adamson line of "Tellevel" automatic bin level control switches.

The equipment is designed so that a rising or falling level of material in bins deflects a pendent float actuating a micro switch.

For hazardous areas where explosive vapors and dust occurs, the explosion-proof type is recommended, while the heavy-duty model is suitable for bins containing heavy material of large lump size. A steel housing protects the switch mechanism and the plastic float ball is replaced by a steel coite.

For further information on either type of "Tellevel," fill out a **Reader Service** card, using number **7-1**.

Defoliant Use Up

Use of liquid defoliants is expected to increase rapidly the USDA estimates in surveying use of the materials by Southeastern cotton farmers.

The farmers are using tractormounted sprayers for applying liquid insecticides on their cotton fields. If the liquid defoliants prove as successful as dusts, the department reported, use should increase accordingly.

Super Production High

Superphosphate production during the first quarter of 1952 was up 38,000 tons from the same period last year, according to the National Fertilizer Association.

Production totaled 3,099,000 short tons for the first three months of this year, the report stated. In

March 1,100,000 tons of super were made, a drop of 7,000 from the same month in 1951, but concentrated super output, 45 per cent A.P.A. basis, was up 1,000 for the month.

On a plant basis, average superphosphate production in March was 5,288, compared to 5,426 tons in March, a year ago.

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Industrial News-

Farm Chemicals Wins Safety Award



Hamilton C. Carson, left, associate editor of FARM CHEMICALS, receives safety award from Roy M. Godwin. chairman of Philadelphia Safety Council.

FARM CHEMICALS is the only trade magazine serving the fertilizer and pesticide industries to receive the National Safety Council's Public Interest Award for "exceptional service to safety."

The award, made in recognition of the magazine's many articles on safety during 1951, was made at a luncheon meeting of the Philadelphia Safety Council, a member of the national organization.

It was presented to Hamilton C. Carson, associate editor of the publication, by Roy M. Godwin, chairman of the board of governors of the Philadelphia group at a meeting of the board in the Bellevue-Stratford Hotel May 21.

Godwin and Walter W. Matthews, managing director of the Philadelphia Safety Council, praised the work of the magazine in helping to make the industries it serves safety conscious in all their activities.

FARM CHEMICALS included numerous news items during the year

about company safety activities and awards in its Industrial News section and in addition printed a series of articles on the various phases of "Farm Chemicals Safety." Several of these were reprinted on request for industry distribution.

Two Pennsalt Units Win National Safety Awards

Two units of Pennsalt Manufacturing company received plaques for safety records during 1951 from the National Safety Council.

The units, the Cornwalls Heights, Pa., plant and the Whitemarsh Research Laboratories at Chestnut Hill, Pa. The former has completed four years with no lost-time accidents, the latter two years.

Both plants, and two others, at Natrona, Pa., and Montgomery, Ala., also received Pennsalt President's Safety plaques for their perfect records last year.

The latter awards are made in a company-wide competition.

Tailing Mills

Vacuum Condensing Systems

FERTILIZER PROCESSING SYSTEMS PAY OFF



These fast fertilizer processing systems have reduced production costs in some plants as much as 65% . . . An estimated cost savings included with a Sackett survey of your production operations may even exceed this figure.

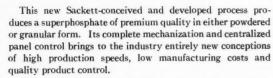
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- 1. liminates waste of manpower.
- 2. Fast-acting weigh valves and printed weigh record provides more rapid and accurate weighing.
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- 5. The installation of this system does not, in any way, disturb existing mixing facilities.

Built in four sizes, 25 tons to 100 tons per hour.

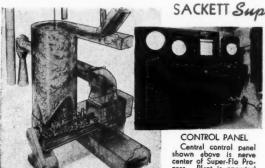
SACKETT Super-Glo... A CONTINUOUS SUPERPHOSPHATE

MANUFACTURING PROCESS



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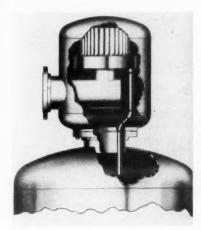
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- Industrial News

7-2 Hi-ef Purifier



Valuable vapors can be recovered by using a new Hi-eF Purifier for chemical vessels, according to the A. D. Anderson company.

When the internal downflow purifier is installed in an auxiliary tank immediately above evaporators and packed towers and inside steel drums, flash tanks, receivers and other vessels, riser discharge and solids are removed before passing on to the distribution piping, the company claims.

The purifiers deliver a vapor with 1 P. M. or less of total solids, the manufacturer guarantees. In other applications 99 per cent of all entrainment is removed. A unique feature of the Hi-eF Purifier is a separating element designed so that the units maintain a constant separating efficiency even when velocities increase.

For further information on the purifiers, fill out a Readers Service card, using number 7-2.

DDT Export Lags

Exportation of DDT has lagged considerably, the Office of International Trade reported recently. According to a recent report, no applications were pending for shipment of the pesticide and 1,532,000 pounds still remained in the quota for the second quarter.

Kolker Supplies DDT For Canadian Spraying

Kolker Chemical company successfully met an exacting schedule recently in developing and supplying 200,000 gallons of a suitable DDT spray for a Canadian spray

The DDT is to be used to control spruce budworms threatening

a 300-square mile section of Crown forest in Restigouche County, New Brunswick.

The chemical spray had to be trucked 60 miles over hilly forest roads before spring thaws made travel possible, from the railhead in Canada.

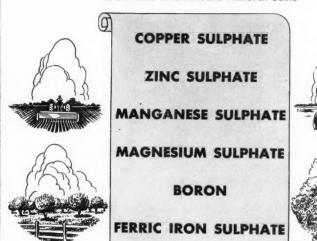
Spraying, with an improvised airfield as base for planes, is scheduled to begin this month.



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Lockland, Ohio

Thurston to Build Plant in Missouri

A two and a half million dollar expansion program has been announced by William R. Thurston, president of Thurston Chemical company of Joplin, Mo. New processing plants, employing 30 to 40 additional people and round the clock operations are planned for Joplin.

Plans have advanced to the point where applications for certificates of necessity are being prepared to present to government agencies for approval.

Thurston says Joplin is exceptionally well located for supplies of most necessary raw materials. New processes will result in a more integrated business. Ample supplies of sulfuric acid and nitric acid which are required in these new processes will be available.

Thurston said some materials that are in short supply will be re-

quired in quantity in fabricating equipment for the new plants, but he does not anticipate delay in erection of the plants.

The present plant, located at Atlas, Mo., will be used in conjunction with the new installations. With these new facilities the company will be able to increase its total output of plant food by approximately 50 per cent.

Recently Thurston signed contracts for a plant at Trenton, Mo. as part of its expansion program. The plant will be an outlet for new products produced in Joplin.

Ag Research Group Gets Four Policies

The Agricultural Research Policy committee of USDA adopted at its May quarterly meeting the following recommendations designed to strengthen the advisory system for agricultural research:

1. Establishment of a temporary

national forestry research advisory committee.

- 2. Establishment of a working group to survey present research on soils, water and fertilizers.
- 3. Creation of a similar group to consider present research on production economics.
- 4. A study by the Policy Committee to determine just what kind and how large an agricultural research program is needed during the next several years to help farmers meet the constantly increasing production of food and feed that is required to provide for the growing population.

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The committee also urged legislation to authorize contracting of agricultural research on production problems so that emergency research demands might be handled more readily. The Agricultural Research Administration already has authority to make contracts with outside agencies for research in marketing or utilization of agricultural products.

NFA Convention . . .

(Continued from page 31)

the advantages of liberty and 2. To avoid a third world war.

One of the most informative meetings at the convention was the discussion at an open meeting of the Plant Food Research Committee. Participating were George V. Taylor, Spencer Chemical company, chairman; Edwin C. Kapusta, N.F.A., secretary; F. W. Darner, Tennessee corporation; Leroy Donald, Lion Oil company; R. M. Jones, Barrett Division; R. A. MacDonald, International Minerals and Chemical corporation and H. B. Siems, Swift and company.

Budget, Dues Cut Approved

A budget of \$260,000 was approved unanimously by the delegates, as was a proposal to lower dues on materials sold to farmers for direct application from the former rate of two to four cents to a flat rate of two cents.

Fred S. Lodge, long-time N.F.A. leader, bowed out of active participation in the association, resigning as secretary and treasurer. His duties as treasurer were absorbed by Dr. Coleman, who was reelected president and as secretary by W. R. Allstetter, who was renamed to the vice presidential post.

Louis Ware moved up from vice chairman of the board of directors to head the board, replacing Totman. E. A. Geoghegan replaced Ware.

Elected to the board were C. J. Cahill, J. B. Snyder, J. C. Leppart, Henning Wattersdorph, J. D. Dawson, and Dr. Coleman. Dr. Coleman was named after a change was made in membership requirements.

Plant Food Convention . .

(Continued from page 37)

high level production on the farm.

W. A. Minor, assistant to the secretary of agriculture, said that "as our country has grown in size and prestige, the contribution which fertilizer has made to agricultural production has been of ever-increasing significance."

O. V. Wells, chief of the Bureau of Agricultural Economics, USDA, said "we have an excellent chance of maintaining a prosperous agriculture provided we are willing to face up to some of the problems involved, including the one of maintaining farm returns at an adequate level."

The American farmer was described as the "low man on the totem pole" by Rep. Harold D. Cooley (D-N. C.), chairman of the House Committee on Agriculture, who called for continued efforts in behalf of farmers "to the end that producers of food, feed and fiber, essential to the welfare of our people, may receive a fairer share of the national income."

Pastures 'Neglected'

Prof. C. J. Chapman, extension specialist in soils at the University of Wisconsin, speaking as a member of the forum on agriculture, called pastures a "neglected crop" and said "improvement of pastures for our livestock is our one great and last opportunity for low cost feed production."

The convention was adjourned June 22 after a breakfast meeting of the board ofdirectors.

How You Can Get

Free Information

On each of the two postage-paid postcards below you can request further information on four items described on this and the Industrial News section of this

issue. Fill out one quarter section for each item in which you are interested.

7-4 Marasperse

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Stable dispersions can be obtained with any insecticide formulated as a wettable powder if Marasperse is used in strengths of 1–2 per cent, according to Marathon corporation. Samples and a booklet giving additional information about the product are available. Non-hygroscopic and a free-flowing powder, Marasperse can be stored indefinitely without caking or deteriorating and is maffected by the hardest water, the company explains. It enhances the action of wetting agents and saves on their use. Code Number 7-4.

7-5 Agrimul

Contamination of insecticides from containers is minimized if Agrimul emulsifiers are used in the process, Nopco Chemical company claims. The emulsifiers are manufactured for polychlor insecticides and herbicides. A booklet giving formulas is available. Nonionic, anionic and combinations of these types are available, information from the company states. Code Number 7-5.

7-6 Fulton Bags

Fulton bags are strong because protec-

tion is built into them, literature from the manufacturer declares. Their water-proof, paper lined bag is a reinforced textile container designed especially for products which require protection inside and out. Extra protection is provided by tough paper or plastic linings laminated with special adhesives to cotton or burlap, from moisture, absorption, evaporation and contamination, a recent company bulletin states. Code Number 7-6.

7-7 Weed Killer

A weed killer with contact and root

Here is a list of the NEW PRODUCTS and BULLETINS described on this and the Industrial News pages of this issue giving their monthly code number.

- 7-1 'Tellevel' Control
- 7-2 Hi-e F Purifier
- 7-3 Drum Conveyor
- 7-4 Marasperse
- 7-5 Agrimul
- 7-6 Fulton Bags
- 7-7 Weed Killer
- 7-8 Payloader Studies
- 7-9 All-Purpose Emulsifiers
- 7-10 Fertilizer Spreader
- 7-11 Granulation Process
- 7-12 Dust Control Illustrated
- 7-13 Pesticide Emulsifiers
- 7-14 Bag Closing
- 7-15 Worthington Mixer

FARM CHEMICALS	Code Number	FARM CHEMICALS	Code Number		
Name		Name			
Title		Title	Title		
Company					
Co. Address		Cc. Address			
FARM CHEMICALS	Code Number	FARM CHEMICALS	Code Number		
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Co. Address					

FARM CHEMICALS	Code Number	FARM CHEMICALS	Code Number		
Name		Name			
Title		Title			
Company		Company			
Co. Address		Co. Address			

action is described in a recent booklet from Pacific Coast Borax company. Called Polybor-Chlorate, it can be used to destroy Johnson grass, Bermuda grasses, bindweed, quackgrass, leaf spurge, Canada thistle, para grass, Russian thistle and many other weeds and grasses. Company says the product is not fire hazardous and is highly soluble. Code Number 7-7.

7-8 Payloader Studies

Detailed word and picture reports of Hough Payloaders are available in job studies issued by the company. Each study of performance of the machinery in specific plants for scooping, carrying, dumping, spreading and stocking all kinds of fertilizer materials and chemicals. Code Number 7-8.

7-9 All-Purpose Emulsifier

Instantaneous dispersion, stability, effectiveness and economy—for years insecticide manufacturers have sought a universal emulsifier which would have all these advantages. Now, according to Remsen Chemicals, Inc., the search has

been ended with development of Remsen Emulsifier 202. The emulsifier works excellently in hard or soft water, according to company literature and provides excellent quality at lower cost. A technical bulletin describes the product. Code Number 7-9.

7-10 Fertilizer Spreader

Greater accuracy of spread with the most positive feed on the market is claimed for the motor-driven spreader developed by Highway Equipment company, Inc. Special advantages of the machine include uniformity of spread, which is not dependent upon truck speed and a conveyor separately driven from truck drive shaft by a series of V-belts to deliver the correct amount of fertilizer per acre. It thus is positively synchronized with speed of rear wheels, according to a booklet from the company. Code Number 7-10.

7-11 Granulation Process

Granulated fertilizer has many advantages—and all are available if Sturtevant equipment is used, the company state Granular fertilizer can be kept in storage bins longer without becoming lumpy, does not "set" in the bag and permit shipment direct to users or distributors warehouses for storage ahead of peak demands. Complete information on the granulation process is available in company literature. Code Number 7-1

7-12 Dust Control Illustrated

A 28-page, two-color bulletin entitle "The Control of Industrial Dust" in offered by Pangborn corporation. Cashistories of users of Pangborn equipmentare documented with photographs an performance data indicating saving made by installing dust control equipment. The Pangborn "CH" system control, utilizing cloth type filters in collection of finely divided dry dusts if featured in the booklet. Code Number 7-12.

7-13 Pesticide Emulsifiers

Range and scope of Emulsol product for agricultural pesticide use is presented in literature from the company Emulsifiers for DDT, Toxaphene, Chlor dane, Heptachlor, Aldrin, Dieldrin, Parthion, BHC and many other pesticide are manufactured by the company Described in the literature also are emulsifiers for petroleum agriculture spray oils. Code Number 7-13.

7-14 Bag Closing

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A 16-page illustrated booklet on fille bag closing machines is offered by Union Special Machine company. The literature tells the manufacturer how the select the right machine for a particular job. Data on sewing heads, columns conveyors, accessories and over a dimensions are given in the booklet along with facts about machines, plant installations and types of closure Code Number 7-14.

7-15 Worthington Mixer

A mixer made by the Worthingw corporation can save mixing time as boost daily output as much as 10 pc cent. Such problems as corroded dicharge chutes, wobbly drum rollers as heavy horsepower consumption are over come in the new models. Code Number 7-15.

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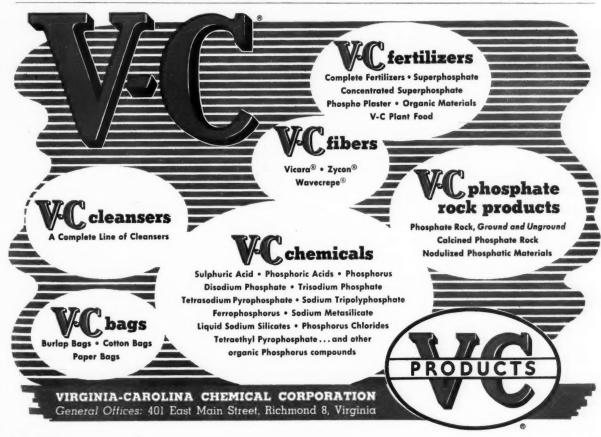
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Industrial News-

New Managers





H. H. Douthit

J. K. Lindsey

Two appointments in the Buffalo and Cincinnati sales districts and plants have been made by International Minerals & Chemical corporation.

Harold H. Douthit was named area manager of the territory, known as Area II and Jack K. Lindsey was appointed district sales manager for the Cincinnati district.

Douhit joined International in 1949 as a technical service representative in promotional development for the potash division. He was transferred to the plant food division last November as assistant to the sales manager.

Lindsey succeeds Roy Monroe, who retired. A native of Mississippi, Lindsey served in the Navy in World War II and joined the company in January.

Wilson Puts 'Poly-Ack' Soil Conditioner on Market

Another in the increasing number of synthetic soil conditioning chemicals was put on the market last month.

The product is Poly-Ack, developed by Wilson Organic Chemicals, Inc., of Sayreville, N. J. Poly-Ack is a resin-type soil conditioning agent which improves soil structure indefinitely by making the soil more friable in converting hard clay soil into lumpy soil of good tilth.

The company says it has tested the chemical on soil and turf and was found to improve workability of soil, give better drainage, increase aeration, retard moisture loss through evaporation, improve water retention capacity and prevent crusting.

Wilson Dye & Chemical Distributors, Inc., associated sales company for Wilson is handling distribution of Poly-Ack.

Tests Show Dilan Good For Control of House Flies

Dilan may be the answer to the increasingly difficult task of controlling house flies this year. The recently developed insecticide is the only approved residual type which will control house flies which have become resistant to all similar type poisons, according to Commercial Solvents corporation.

This has been established during the past two years by tests at federal and state experiment stations. According to reports of these tests, Dilan is different in its action on house flies from other poisons and fly does not have the ability to reduce it to a harmless state.

One treatment with Dilan gives a high degree of house fly control from five to nine weeks.

Pennsalt Markets "Penthon" Insecticide with Malathon

"Penthon," a new organic-phosphate type insecticide specially designed for protection of apples and pears and certain other crops, has been formulated for commercial use by Pennsylvania Salt Manufacturing company.

Containing malathon C compound 4049, as the active insecticidal chemical "Penthon" provides effective control in conjunction with greatly reduced toxicity to man. It also has been tested extensively as a spray and in an aerosol on ornamental plants, out-of-doors and under glass and shows exceptionally good plant tolerance to a wide variety of plants.

"Penthon" is sold in both powder and liquid form: "Penthon" E-So, and emulsifiable concentrate containing 50 per cent malathon, and "Penthon" W-25, a wettable powder containing 25 per cent malathon. Both the wettable powder and the emulsion may be used with the more commonly known insecticides.

Sharples Unit Integrated With Pennsalt Division

The Research Department of Sharples Chemicals, Inc. will be integrated with the Research and Development division of the Pennsylvania Salt Manufacturing company, according to Dr. W. A. La Laude Jr., manager of Pennsalt's division. Integration will occur between June 15 and Sept. 15.

Organizational changes to be made include promotion of Dr. John F. Gall, currently supervisor of research, to director of the inorganic research department; appointment of Dr. John F. Olin, now director of research for Sharples Chemicals to director of the organic research department, with Dr. George T. McCoy, presently Pennsalt's organic group leader as technical assistant director, and T. E. Deqer, Sharples assistant research director as administrative assistant director.

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-Industrial News-

7-3 Drum Conveyor

Eliminate manual lifting, cut work-hours and empty and wash drums in a dust-free manner. These advantages are promised by Gifford-Wood company if their newly designed, fully automatic conveyor system for emptying drums is installed.

Several installations already have been made successfully in farm chemicals industries, according to the company. Up to 40 drums an hour can be emptied with the conveyor system.

Four principal units are included in the system: a totally enclosed automatic skip hoist, a transfer conveyor, an automatic drum washer and a lowerator.

Here's how the system works: A roller conveyor brings drums to the skip-hoist enclosure, an air operated door opens automatically and a drum is pushed onto an elevating carriage by an air operated pusher.

As the door closes, clamps on the carriage grasp the drum (either 30 or 50 gallon size) and the hoist elevates and up-ends the drum.

The drum then is released from the clamps and drops onto the grating which is electrically vibrated to dislodge any material remaining in the drum. In succeeding motions, the drum is transferred, washed, rinsed and dried. The entire operation is automatic and performed in dust tight casing, Gifford-Wood states. For further information, fill out a **Reader Service Card**, using **7-3**.

New Armour Plant

Latest methods for preparing high analysis plant foods formulated for soils and crops in the Iowa area will be used in a new Armour Fertilizer Works plant at Waterloo, Ia.

Reason for construction of the new plant was given by John E. Sanford, president, who said "with plant food consumption now at an all-time high in Iowa, a modern plant, strategically located, should be a real boon to the farmers of that state."

Du Pont Awarded Tenth Consecutive Safety Award

Last year was the safest in Du Pont history. Because of the especially low company accident rate of the company during the year, it was awarded the National Safety Council's highest industrial award, the Award of Honor for 1951

The company is the only one in the United States to have won the honor for 10 consecutive years. The frequency rate, the number of time-losing injuries per million man-hours worked, was 0.67 for the year. This mark was an improvement of approximately 7 per cent over 1950, previous best year for Du Pont.

An indication of the significance of the rate can be seen by comparing it with the most recent available rate for the chemical industry as a whole—5.82 and the rate for all industry—9.30.

Many units of the company established outstanding safety records during the year which will be recognized by individual awards from the council.

Toxaphene Warning

R. P. Mullett, extension entomologist and plant pathologist for Tennessee has issued a warning note against use of toxaphene on tobacco because of residues. Mullett recommends rothane (TDE, DDD) and lead arsenate. He recommends use of malathon over parathion against aphids.

ISM Elects Officers

Officers of the International Superphosphate Manufacturer's Association for the year 1952-53 elected at the recent meeting in Cannes, France, include R. Standaert (Belgium), President; D. J. Bird (United Kingdom), A. Bloembergen (Netherlands), J. Capelo Portabella (Spain), B. Corbjornsen (Sweden) and H. Stevenius Nielsen (Denmark) vice presidents and G. F. New, acting secretary.

Fifty of the 70 delegates, representing 20 different countries, flew to Constantine, Algeria, where they inspected the Cie des Phosphates de Constantine.

Your partners

are the farm families throughout the nation who buy your products. Many of their production needs are closely related to yours.

Their success in meeting this year's greatly increased food and fiber goals depends to a large extent upon your ability to manufacture and distribute essential supplies of fertilizers and pesticides.

Farm organization leaders, along with their experienced Washington staffs, are constantly presenting factual data on farm operations to key Congressional and Government officials.

Mounting defense production problems clearly show the need for close liaison between leaders in both groups.

It is apparent that you will both make a greater contribution toward a stronger America with a full breadbasket by . . . working together as partners.

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- Industrial News -

Infestations spread . . .

United States Pest Survey

CEREAL, FORAGE INSECTS European Corn Borer—Pupation well under way in central corn belt and nearly complete in Kan. and southern Ill. In the southern part of Ill. it was a little ahead of last year and somewhat behind in the central and northern sections.

The borer has invaded Ark. and farmers have been warned to be on the lookout for it and the **Southwestern Corn Borer**. It was first found in the state during 1950 in four northeastern counties and in 1951 was found to have infested southwest Mo. to the Ark. line.

In Ky., a 1951 fall population survey showed the number of borers going into hibernation to be about half that of the previous year. A report from the state says it is probable the establishment of firstgeneration larvae will be potentially higher than last year.

Surviving overwintering borers appeared in very good condition in Minn. Moth flight was under way south of St. Louis; pupation was well advanced in all counties west to Allegany in Md. and adults had

been spotted in Md. and Del.

Greenbug—Reported in central III. in oats and wheat, to abundance in some areas. Also located in several Kan. counties with some damage seen on oats. Scarce on wheat in that state.

Alfalfa Weevil—An extension of the infestation in Col. was uncovered when both adults and larvae were taken southeast of Colorado Springs. Some damage in untreated fields noted in northern Utah and larval damage under way in Canyon county, Ida. Adults overwintered in greater numbers than usual in Modoc county, Calif.

In the East surveys indicated the insect occurs throughout Del. with most severe damage located east of Smyrna and near Adamsville. Elsewhere infestation is reported light to moderate and spotty. Found in Cecil and Queen Anne counties, Md.

Sugarcane Borer—Very heavy first generation infestation over the Teche area of La. and rather heavy ones appeared in the Bayou La-Fourche and Mississippi areas of that state.

Spittlebug—Transforming to the adult stage and expected to be heavy in Md. hay fields. Damage to forage crops in that area continues. Numerous on Del. alfalfa; heavier than usual infestations expected throughout Ind. and infestations general in legumes in Ill. with highest populations on record in north central quarter.

Armyworm-Outbreak occurred

in northern tier of middle and western Tenn. counties with severe damage to small grains and grasses. Considerable damage occurred on wheat, barley and pastures in southeast Mo.

Injury in fields adjacent to maturing rye reported on eastern shore of Va.; destroying rye in one county.

Other reports of armyworm infestations include corn injury in fields adjacent to maturing rye in Va. eastern shore; serious damage to small grains and timothy in southern Ill.; destruction of rye in one Miss. county; damage to small grains and grasses in a Ky. county and discovery of some in areas of Md. and Del.

FRUIT INSECTS

Red-Banded Leaf Roller—Hatching in Mass. and southern Mich. Infestations in Ill. with but few exceptions appeared light but increasing in southern part of state. Unusual numbers of larvae in peach and increased numbers in unsprayed apples reported.

Development retarded by cold temperatures in Mo.; hatching in western part of N. Y. and considerable numbers of egg masses noted in the Hudson River Valley and western N. Y. Hatching com-

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(SINCE 1898)

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ALDRIN

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AMMONIA-Anhydrous and Liquor

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DDT

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DIELDRIN

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DILUENTS

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DRYERS

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LOADERS-Car and Wagon

Sackett & Sons Co., The A. J., Baltimore, Md.

Industrial News -

plete in southeastern Penna., not yet begun in Erie area.

Codling Moth—Emerging in southern portion of N. J., pupation complete in southeastern Penna. and 25 per cent of moths emerged.

Hatch expected in Ill. and Ind. areas with warm weather. Stings appearing in southern part of that area. Emerged in Mo., Okla. and Md. Moths seen in Md.

Fruit Aphids—Rosy apple aphid abundant in some northeastern areas; heavy on some untreated blocks in Westchester county, N. Y.; generally abundant in Del.; and present throughout Md. where blocks were not sprayed.

Apple grain aphid reported especially heavy in Wis. Unusually heavy populations of the pest spotted in some northeastern Ohio orchards. In Ohio also, the rosy apple aphid was reported more abundant than usual.

Plum Curculio—Infestation in peach crops at Fort Valley, Ga., were reported much heavier than last year and heavier than usual. Still active in Mass., lower Hudson River Valley of N. Y., and N. J. Peak of activity reached in Mo. Curculio is well past first brood peak in southern Ill. and Ind.

European Red Mite—Summer eggs seen in lower Hudson Valley, N. Y.; overwintered eggs hatching in western part of state. Various stages, including adults found in N. J. and all stages present in southeastern Pa. Newly-hatched

mites starting to appear on southern Ida. prunes.

Fruit Tree Leaf Roller—Infestation in Los Angeles county, Calif., citrus much greater than last year. Considerable damage has resulted.

In Wenatchee district, Wash., severe infestations are reported on apricot and cherry. An unidentified leaf roller, believed to be this species has caused light damage to English walnut foliage in San Bernardino county, Calif.

VEGETABLE INSECTS

Mexican Bean Beetle—Adults appearing in Penna. and N. J. Moderate infestation on some snap beans at Charleston, S. C.; first brood larvae pupating in Miss. and young larvae of late emerging adults are bulk of population in that state. Present in lima, green and soy beans in some areas in Del.

Bean Leaf Beetle—Attacked green, lima and soy beans in Del., injuring snap and lima beans in eastern Va. Numerous on seedling beans in S. C. and caused light injury to beans near Nashville, Tenn.

Colorado Potato Beetle—Unusually abundant on potatoes near Grandview, Wash. and becoming abundant at Nashville, Tenn. Light infestation in Ashe county, N. C., moderately heavy on eggplant at Quincy, Fla., on potatoes throughout S. C. and caused damage to potatoes in coastal plant area of N. C.

Cabbage Caterpillars—At Charleston, S. C., late-spring plants heavily infested with imported cabbage worm and cabbage looper. Small numbers of larvae and many adults of imported worm at Nashville, Tenn. Cabbage maggots caused severe damage in eastern S. D.

Vegetable Weevil—On tomatoes at eastern shore of Va., potatoes in two N. C. counties, tobacco in two Tenn. counties, and on cabbage in Orange county, Calif. Adults damaging tomato and pimiento pepper in S. C.; considerable damage to tomatoes and less to carrots reported in early May from three Ga. counties.

COTTON INSECTS

Boll Weevil—Coming out of hibernation during late May in western Tenn. Light in Texas coastal bend area some found in upper coastal and south central areas. Pink bollworms common in coastal bend section.

Squares punctured in southern Ga., 350 weevils per acre found in one field. Mid-May survey in N. C. showed none in early-planted cotton in two counties. Survey of Delta area of Miss. showed only one weevil; averaged 38 per acre in chopped cotton through Tallulah, La. area.

Thrips—Increasing in all upper Piedmont counties of S. C. and in Marlboro county, damaged seedlings in Spalding county, Ga. Found 60 of 85 fields damaged in Miss. Delta area.

POTASH Call or wire ALEXANDER M. MCIVER & SON P. O. BOX 155 Charleston, S. C. Phones: L. D. 921 and 922

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NITROGEN SOLUTIONS Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C. Carnegie Chemical Mfg. Co., Los Angeles, Cal. Lion Oil Company, El Dorado, Ark. Phillips Chemical Co., Bartlesville, Okla. Spencer Chemical Co., Kansas City, Mo.

NITROGEN MATERIALS—Organic American Agriculture Chemical Co., N. Y. C. Armour Fertilizer Works, Atlanta, Ga. Ashcraft-Wilkinson Co., Atlanta, Ga. International Min. & Chem. Corp., Chicago, Ill. Jackle, Frank R., New York City McIver & Son, Alex. M., Charleston, S. C. Woodward & Dickerson, Inc., Philadelphia, Pa.

NOZZLES-Spray Monarch Mfg. Works, Philadelphia, Pa. Spraying Systems Co., Bellwood, Ill.

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PHOSPHORIC ACID American Agricultural Chemical Co., N. Y. C. Gen. Chem. Div., Allied Chem. & Dye., N. Y. C. Monsanto Chemical Co., St. Louis, Mo.

PLANT CONSTRUCTION—Fertilizer and Acid Atlanta Utility Works, The, East Point, Ga. Chemical Construction Corp., New York City General Industrial Development Corp., N. Y. C. Monsanto Chemical Co., St. Louis, Mo. Sackett & Sons Co., The A. J., Baltimore, Md. Stedman Foundry and Machine Co., Aurora, Ind. Titlestad Corporation Nicolay, New York City

POTASH-Muriate

American Potash & Chemical Corp., N. Y. C. Ashcraft-Wilkinson Co., (Duval Potash) Atlanta,

International Min. & Chem. Corp., Chicago, Ill. McIver & Son, Alex. M., Charleston, S. C. Potash Co. of America, New York City Southwest Potash Corp., New York City United States Potash Co., N. Y. C.

POTASH-Sulfate

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POTASSIUM PHOSPHATE Monsanto Chemical Co., St. Louis, Mo.

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PYROPHYLLITE

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SCREENS

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SEPARATORS-Air Sackett & Sons Co., The A. J., Baltimore, Md.

SOIL TESTING APPARATUS La Motte Chemical Products Co., Baltimore, Md.

SPRAYS

Monarch Mfg. Works, Inc., Philadelphia, Pa. Spraying Systems Co., Bellwood, Ill.

STORAGE BUILDINGS Marietta Concrete Corporation, Marietta, Ohio

SULFATE OF AMMONIA

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Virginia-Carolina Chemical Corp., Richmond, Va.

SUPERPHOSPHATE

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U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla. Virginia-Carolina Chemical Corp., Richmond, Va. Woodward & Dickerson, Inc., Philadelphia, Pa.

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Armour Fertilizer Works, Atlanta, Ga. International Min. & Chem. Corp., Chicago, Ill. U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla. Virginia-Carolina Chemical Corp., Richmond, Va. Woodward & Dickerson, Inc., Philadelphia. Pa.

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Gen. Chem. Div., Allied Chem. & Dye, N. Y. C. Monsanto Chemical Co., St. Louis, Mo.

UREA & UREA PRODUCTS Carnegie Chemical Mfg. Co., Los Angeles, Cal. Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.

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Survey Shows Pesticide Needs

ESTIMATES of the proportion of current pesticides supplies which will be needed in each region of the United States are given in a summary prepared and released recently by USDA.

Manufacturers of pesticides will be specially interested in the survey, which is an extension of the national and territorial survey of farmers' requirements for pesticides made by the Office of Materials and Facilities, Production and Marketing Administration, released April 1.

Members of the pesticide industry helped in preparation of the survey, which covered quantities of pesticides estimated to have been used during the crop years 1949–50 and 1950–51 and farmers' requirements for the 1951–52 crop year.

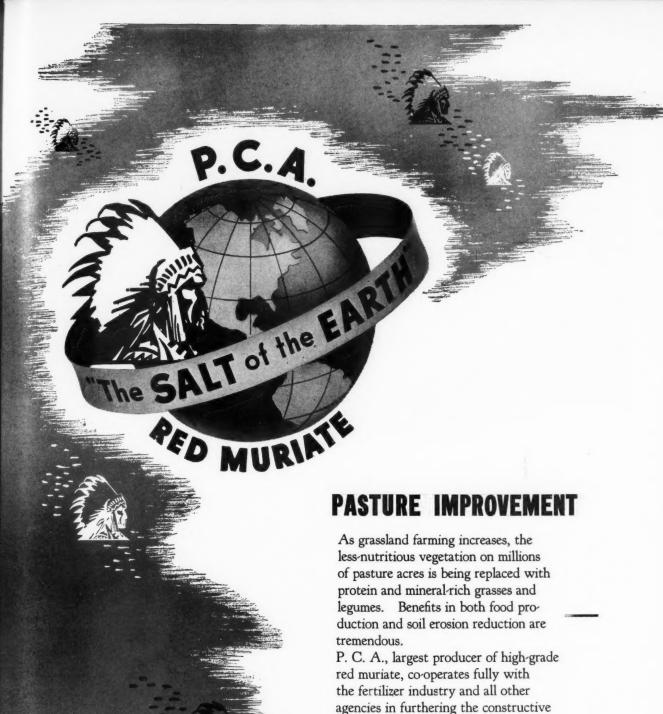
The survey was made under sponsorship of PMA state committees and Insular Area Offices.

The study covered 42 chemicals, 22 used primarily as insecticides, seven as fungicides, 11 as herbicides and defoliants and two as vermifuges for livestock. Pattern of distribution or use naturally is related directly to occurrence of major pests against which the materials are most widely employed.

A table showing regional distribution of usage of the 42 chemicals is available from the Office of Materials and Facilites, PMA, USDA, Washington 25, D. C.

The following table shows regional distribution of 11 typical major pesticides, expressed as percentage of the combined total quantity of each material estimated to have been used in 1949–50 and 1950–51:

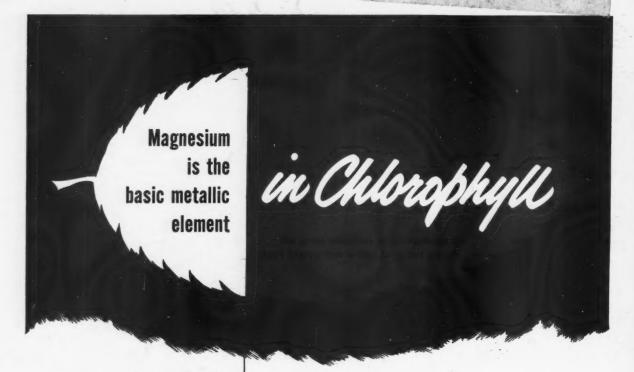
Pesticides	New England and Middle Atlantic States	Southern States	North Central States	Rocky Mountain and Pacific Coast States
Benzene hexachloride	2	66	3	29
Calcium arsenate	5	92	1	2
Copper compounds	38	24	31	7
2,4-D	. 2	16	53	29
DDT	. 14	43	18	25
Dithiocarbamates (synthetic fungicides)		30	31	4
Grain fumigants (liquid)	. 5	33	49	13
Lead arsenate	. 45	21	27	7
Parathion	. 16	32	20	32
Rotenone	. 50	24	17	9
Sulfur, conditioned	. 13	57	5	25



POTASH COMPANY OF AMERICA Carlsbad, New Mexico

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Magnesium concentrates in the seed with phospherus to aid in the formation of oils and proteins required for viable seed.

Magnesium functions as a carrier of phosphates to the actively growing and fruiting parts of the plant.

Magnesium is required to activate the processes which stimulate the production and transport of carbohydrates and proteins within the growing plant.

Magnesium, in sufficient quantities, enables the plant to utilize other plant nutrients for healthy, disease-resistant growth.

Magnesium stimulates the growth of soil bacteria and increases the nitrogen-fixing power of legumes.



Double Sulfate of Potash-Magnesia

What makes a plant grow? The chemical actions of mineral nutrients, sunlight, water and carbon dioxide. The key to the combination is *chlorophyll*, the green plant substance that is essential for all plant life. Chlorophyll draws from the sun the energy needed for plant growth. Formation of chlorophyll in the plant depends on *magnesium* the only metallic element in the chlorophyll molecule. If insufficient magnesium is available to the plant, a typical deficiency symptom is a yellowing or discoloring between the veins usually first on the lower leaves of the plant. This is a warning signal that the chlorophyll content of the plant is too low to capture enough of the sun's energy for healthy growth.

When you include soluble magnesium in your quality fertilizers prepared for use on soils which are deficient in magnesium, you increase the effectiveness of the other plant nutrients. They will give the plant a healthier start, hasten maturity and increase yield and quality of tobacco, cotton, citrus, corn, small grains, potatoes, vegetables, legumes and other crops.

Many farmers have found by profitable experience that the most practical and economical way to supply soluble magnesium to their soils is with Sul-Po-Mag. Sul-Po-Mag is a properly balanced source of magnesium and potash, both in sulfate form, water-soluble and immediately available to the growing crop. Sul-Po-Mag is produced exclusively by International and is supplied for use in quality mixed fertilizers and bagged for direct application to the soil.

ed and Refined at Carlsbad by International for Fertilizer Manufacturers

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

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